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PERFORMANCE CHARACTERISTICS OF AUTOMOTIVE ENGINES IN THE UNITED STATES
Second Series--Report No. 1
1976 Chevrolet Vega 140 CID (2.3 Liters), 2V

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APRIL 1978

INTERIM REPORT

DOCUMENT IS AVAILABLE TO THE U.S. PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22161

Prepared for

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NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
Office of Research and Development
Washington DC 20590

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16. Abstract

Experimental data were obtained in dynamometer tests of a 1976 Chevrolet Vega 2.3-liter, 140-CID engine to determine fuel consumption and emissions (hydrocarbon, carbon monoxide, oxides of nitrogen) at steady-state engine-operating modes. The objective of the program is to obtain engine-performance data for estimating emissions and fuel economy for varied engine service and duty. The intent of the work is to provide basic engine characteristic data required as input for engineering calculations involving ground transportation.

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PREFACE

This report, prepared by the U.S. Department of Energy, Bartlesville Energy Research Center, for the U.S. Department of Transportation, Transportation Systems Center, Energy Technology Branch, Cambridge MA, presents results of experimental work to obtain information on performance characteristics of an engine used in automobiles sold in the United States. The engine used in this work is one of a series of 10 engines to be tested in the current program. This is the first of the reports to be published covering work with those engines.

This project is funded by the National Highway Traffic Safety Administration, Office of Research and Development, Office of Passenger Vehicle Research, Technology Assessment Division.

Ralph G. Colello and James A. Kidd, Jr., of the U.S. Department of Transportation, Transportation Systems Center are the technical monitors.

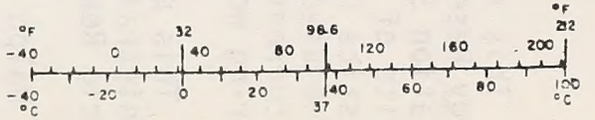
METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
		AREA		
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
		MASS (weight)		
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
		VOLUME		
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
		TEMPERATURE (exact)		
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
		AREA		
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
		MASS (weight)		
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
		VOLUME		
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
		TEMPERATURE (exact)		
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



1. INTRODUCTION

Data acquired from steady-state tests of a 1976 Chevrolet Vega 2.3-liter (140 cubic-inch-displacement) engine are presented in this report. The test results are sufficient to establish maps of fuel consumption and emissions of carbon monoxide, unburned hydrocarbons, and oxides of nitrogen over the operating range of the engine.

The Chevrolet 2.3-liter engine is one of a series of 10 engines to be tested in the current program. The steady-state maps of emissions and fuel economy generated by this study may be used to predict engine and emission control-system performance for transient operation.

2. ENGINE TEST REPORT

A new mean-tolerance 1976 Chevrolet Vega 2.3-liter engine was acquired for this series of tests. The engine was mounted on a test stand and coupled to an eddy-current dynamometer. All engine accessories were included in the test installation except for the cooling fan and radiator. An alternator was mounted on the engine but was not connected to the electrical system. Emission control systems included exhaust-gas recirculation (EGR) and an oxidation catalyst. Table 1 contains the manufacturer's general specifications for the 1976 Chevrolet Vega 2.3-liter engine.

Prior to the start of the testing program, the engine was broken in at speeds and power settings comparable with normal vehicle operation. Table 2 contains details of the break-in schedule that was used. A single batch of unleaded, regular grade gasoline was used for the entire break-in period and test program. An analysis of the fuel appears in table 3.

Steady-state tests of the engine were made at the speed and load points indicated in table 4. At selected speeds, the engine was driven by an electric motor to simulate closed-throttle decelerations. The following data items were recorded at each test point:

Test number
Date
Barometric pressure, mm Hg
Dew point, °F
Inlet air temperature, °F
Speed, rpm
Torque, lb-ft -- BLH strain gage load cell; Daytronics indicator
Fuel rate, lb/hr -- Fluidyne positive displacement fuel flowmeter
Ignition timing, °BTC
Manifold vacuum, in. Hg
Throttle Angle, deg
CO, pct -- Beckman NDIR
CO_2, pct -- Beckman NDIR
O_2, pct -- Beckman polarographic detector
HC, ppmC -- Custom-built heated flame ionization detector
NO_x, ppm -- Thermo-Electron chemiluminescent detector
Oil temperature, °F
Oil pressure, psig
Coolant temperature, °F
Exhaust temperature, °F
Exhaust pressure, in. H_2O
Intake manifold temperature, °F.

The following equations were used in calculating power, air/fuel ratio, absolute humidity, and mass emission rates of carbon monoxide (CO), unburned hydrocarbons (HC), and oxides of nitrogen (NO_x):

1. Partial pressure of water vapor in intake air (millimeters of mercury):

$$P = \exp\left[18.717 - \frac{7308.1}{393 + D}\right],$$

where D = dewpoint, °F.

2. Absolute humidity (grains moisture per pound dry air):

$$H = \frac{4347.8(P)}{B - P},$$

where B = barometric pressure, mm Hg.

3. Humidity correction factor (dimensionless):

$$K_H = \frac{1}{1 - 0.0047(H - 75)}.$$

Note: This factor is used to correct the NO_x mass emission rate to a standard humidity of 75 grains moisture per pound dry air.

4. Stoichiometric air/fuel ratio (dimensionless):

$$AF_s = \frac{69(2 + \frac{x}{2} - y)}{MW_{fuel}},$$

where x = hydrogen-carbon atomic ratio of fuel
y = oxygen-carbon atomic ratio of fuel
MW_{fuel} = fuel molecular weight per carbon atom
= 12.01115 + 1.00797x + 15.9994y.

5. Hydrogen concentration in raw exhaust (percent):

$$H_2 = \frac{x(CO)(CO + CO_2)}{2(CO + 3CO_2)},$$

where CO = carbon-monoxide concentration (percent)
CO_2 = carbon-dioxide concentration (percent).

Note: This equation assumes a water-gas shift equilibrium constant

$$\frac{(CO)(H_2O)}{(CO_2)(H_2)} = 3 .$$

6. Correction factor for emission concentrations from wet basis to dry basis (dimensionless):

$$C_W = 1 + \frac{(\frac{x}{2})(CO + CO_2) - H_2}{100} .$$

Note: In these tests only HC is measured on a wet basis. All other species are measured on a dry basis.

7. Air/Fuel ratio (dimensionless):

$$AF = \frac{AF_S}{2 + \frac{x}{2} - y}\left[\frac{(1+ \frac{x}{2} - y)(CO) + (2 + \frac{x}{2} - y)(CO_2) + 2(O_2) + \frac{NO_x}{10^4} - H_2}{CO + CO_2 + C_W\ (\frac{HC}{10^4})}\right],$$

where O_2 = oxygen concentration (percent)
NO_x = oxides of nitrogen (ppm)
HC = unburned hydrocarbon concentration (ppmC).

8. Exhaust flow (pounds per hour):

$$M_{EX} = \frac{M_F(1 + AF)}{C_W} ,$$

where M_F = fuel flow rate (pounds per hour).

9. Carbon monoxide mass emission rate (grams per hour):

$$M_{CO} = M_{EX}(\frac{CO}{100})(\frac{MW_{CO}}{MW_{EX}})453.59237 ,$$

where MW_{CO} = molecular weight of CO (=28.01115)
MW_{EX} = molecular weight of exhaust gas (=28.967) .

10. Unburned hydrocarbon mass emission rate (grams per hour):

$$M_{HC} = M_{EX}(\frac{HC}{10^6})(\frac{MW_{HC}}{MW_{EX}})\ C_W\ 453.59237.$$

where MW_{HC} = molecular weight per carbon atom of HC
= 12.01115 + 1.00797x + 15.9994y.

11. Oxides of nitrogen mass emission rate (grams per hour):

$$M_{NO_x} = M_{EX}\left(\frac{NO_x}{10^6}\right)\left(\frac{MW_{NO_x}}{MW_{EX}}\right)(K_H)453.59237 ,$$

where MW_{NO_x} = molecular weight of NO_2 (=46.0028) .

12. Power (brake horsepower corrected to a standard barometric pressure of 736.6 mm Hg and a standard temperature of 85° F):

$$HP = \frac{N(T)}{5252.113}\left(\frac{736.6}{B - P}\right)\sqrt{\frac{t + 460}{545}} ,$$

where N = engine speed (revolutions per minute)
T = brake torque (foot-pounds)
t = air temperature (°F).

3. DISCUSSION OF TEST RESULTS

The maximum torque and power outputs measured in these tests were in agreement with the manufacturer's specifications. Emission rates of CO, HC, and NO_x were typical of modern engines equipped with exhaust-gas-recirculation (EGR) systems and oxidation catalysts. The carburetor was set for lean operation for low-power operation, enabling the catalyst to control CO and HC effectively. At higher-power levels, the air/fuel ratio tended to decrease, resulting in less effective catalytic treatment of CO and HC. At a given speed, emissions of NO_x tended to reach a maximum somewhat below peak power. Above this power level, fuel-rich engine operation resulted in a decrease in NO_x emissions. See figures 1 through 6.

The data presented in this report are sufficient to establish steady-state maps of fuel consumption and emission rates for the 1976 Chevrolet Vega 2.3-liter engine.

4. CONCLUSIONS

The purpose of the experimental work reported here is to establish data for this engine. Those data are presented in the tables accompanying this report.

TABLE 1. MANUFACTURER'S ENGINE SPECIFICATIONS

Displacement, cu in	140
Maximum horsepower, bhp @ 4,400 rpm	84
Maximum torque, lb-ft @ 1,300 rpm	113
Bore and stroke, in	3.500 x 3.625
Configuration	in-line 4-cylinder
Compression ratio	8.0:1
Firing order	1-3-4-2
Ignition timing at idle speed, °BTDC @ 750 rpm	12
Block material	aluminum
Head material	cast iron
Number of crankshaft main bearings	5
Number of compression rings/piston	2
Number of oil rings/piston	1
Cam drive type	belt and sprocket
Valve lift:	
Intake, in	0.400 ± 0.002
Exhaust, in	0.415 ± 0.002
Spark plug gap, in	0.035
Engine weight, lb	310
Crankcase emission control:	
Control method	positive crankcase ventilation
Point of discharge	intake manifold
Carburetor type	2 barrel down draft
Distributor specifications:	
Centrifugal advance, begins, ° @ 1,600 rpm	0
Centrifugal advance, intermediate, ° @ 2,000 rpm	5
Centrifugal advance, full, ° @ 4,800 rpm	22
Vacuum advance, begins, ° @ 5 in. Hg	0
Vacuum advance, maximum, ° @ 12 in. Hg	24
Distributor number	1112862

TABLE 2. ENGINE BREAK-IN SCHEDULE

Simulated vehicle speed, mph	Engine speed, rpm	Manifold vacuum, in. Hg	Time in mode, min
0	Idle	16.0	15
20	1,100	18.4	"
30	1,500	13.0	"
40	1,900	12.0	"
50	2,325	12.4	"
60	2,800	11.1	"
25	1,300	15.5	"
35	1,700	12.5	"
45	2,100	12.2	"
55	2,550	11.8	"

Mileage per cycle = 90.
Total mileage accumulated over 40-hour break-in period = 1,440.

TABLE 3. FUEL ANALYSIS

Fuel No.	7619
Research octane No.	91.5
Motor octane No.	83.5
Specific gravity	0.7161
API gravity, deg.	66.1
Distillation, °F	
10 pct evaporated	128
50 pct "	218
95 pct "	404
100 pct "	417
Reid vapor pressure, psig	9.5
FIA analysis, pct:	
Aromatics	6
Olefins	17
Paraffins	77
Sulfur, pct	0.024
Lead, grams/gal	Trace
Hydrogen/carbon atomic ratio	2.040
Oxygen/carbon atomic ratio	0.000

TABLE 4. TEST-NUMBER CROSS-REFERENCE INDEX

Pct Full Load	Engine Speed, rpm										
	600	750	1,000	1,500	2,000	2,600	2,800	3,200	3,800	4,400	4,600
0		1	13 74 113 115	21 79	29 84	37 89	45 94 123	53 99	61 104	69 109	
10		110	73 114	20 78 116	28 83	36 88 125	44 93 124	52 98	60 103	68 108	
25		2	12 72	19 77 117 119	27 82	35 87	43 92	51 97	59 102	67 107	
40			11 71	18 76 118	26 81	34 86	42 91	50 96	58 101	66 106	
60		3	10	17	25 120	33	41	49	57	65	
75		4	9 70	16 75	24 80 121	32 85	40 90	48 95	56 100	64 105	
90			8	15	23 122	31	39	47	55	63 165	
100	6 111	5	7 164	14 163	22 162	30 161	38 160	46 159	54 158	62 157	112 156

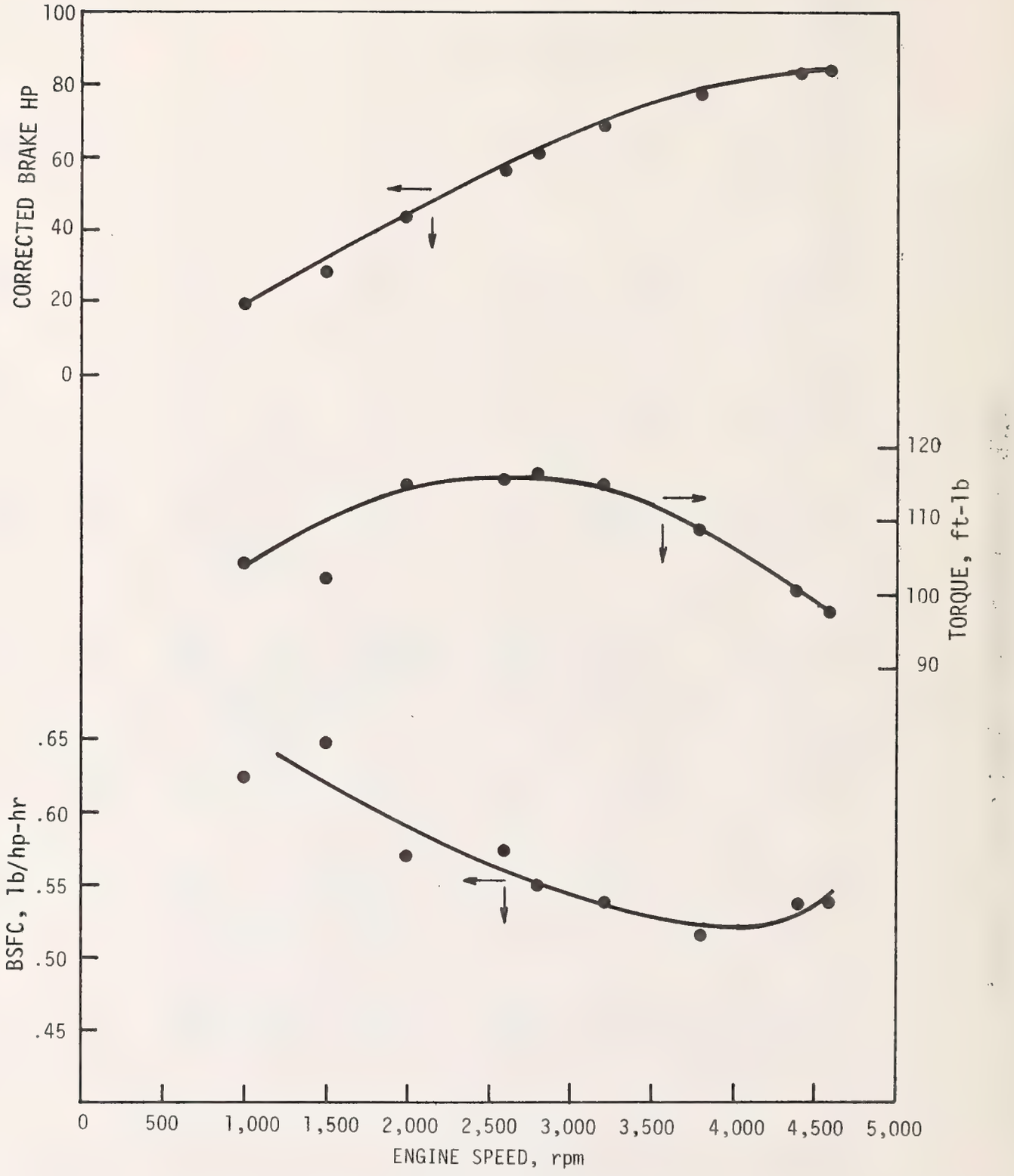


FIGURE 1. Brake Specific Fuel Consumption, Torque, and Brake Horsepower versus Engine rpm at Wide-Open-Throttle--Chevrolet Vega 2.3 Liter Engine.

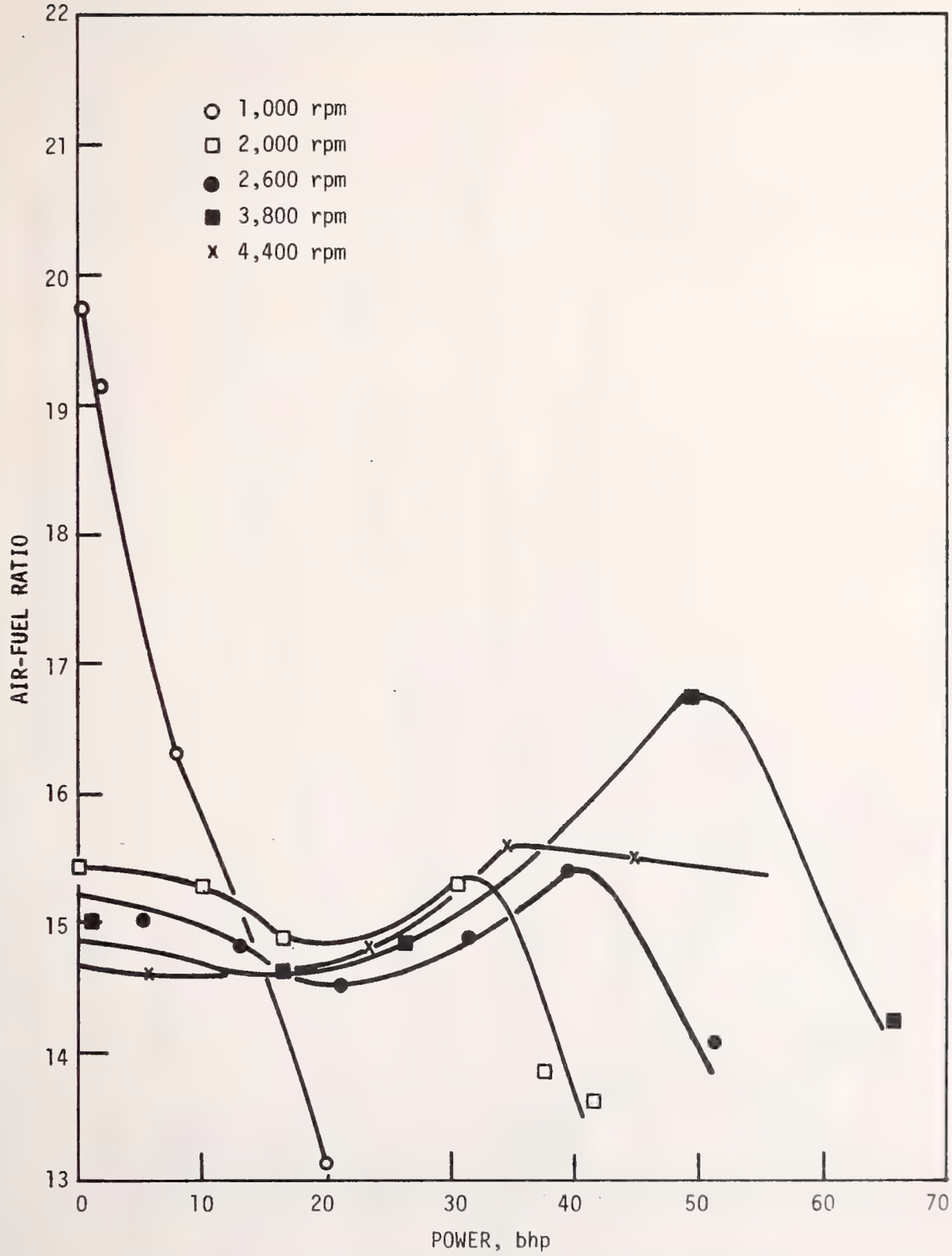


FIGURE 2. Air Fuel Ratio versus Power at Various Speed and Load Conditions--Chevrolet Vega 2.3 Liter Engine.

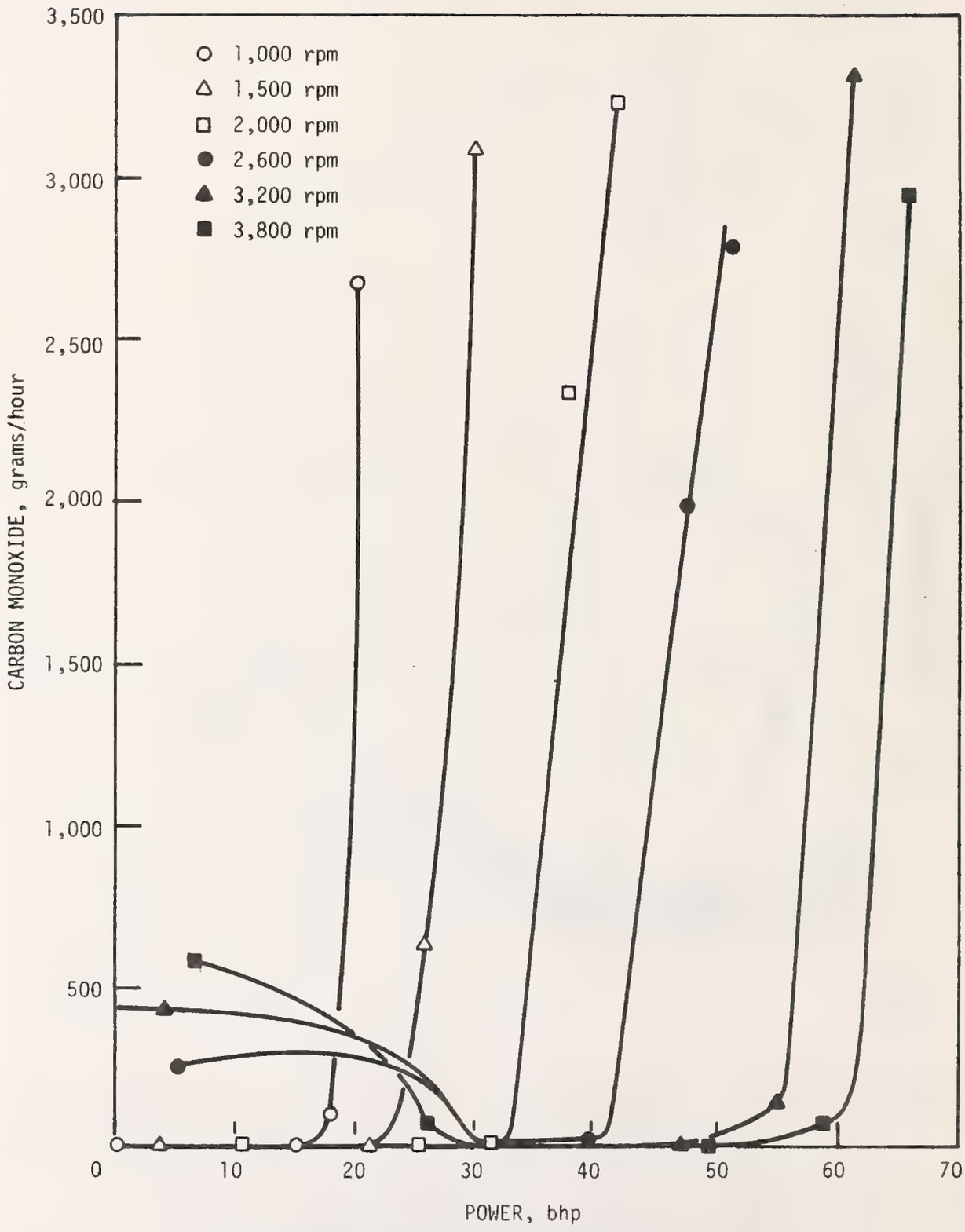


FIGURE 3. Carbon Monoxide Emissions versus Power at Various Speed and Load Conditions--Chevrolet Vega 2.3 Liter Engine.

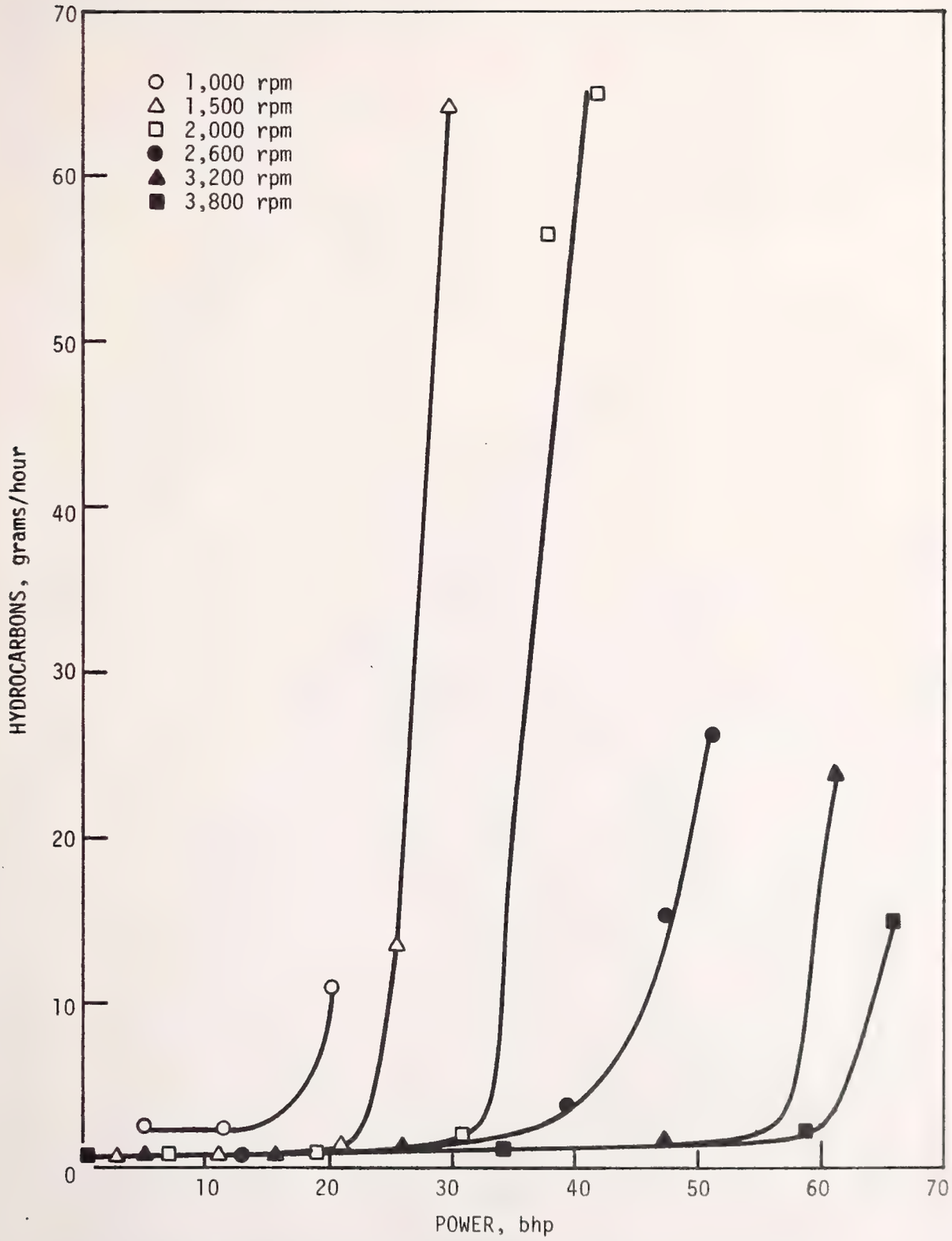


FIGURE 4. Hydrocarbon Emissions versus Power at Various Speed and Load Conditions--Chevrolet Vega 2.3 Liter Engine.

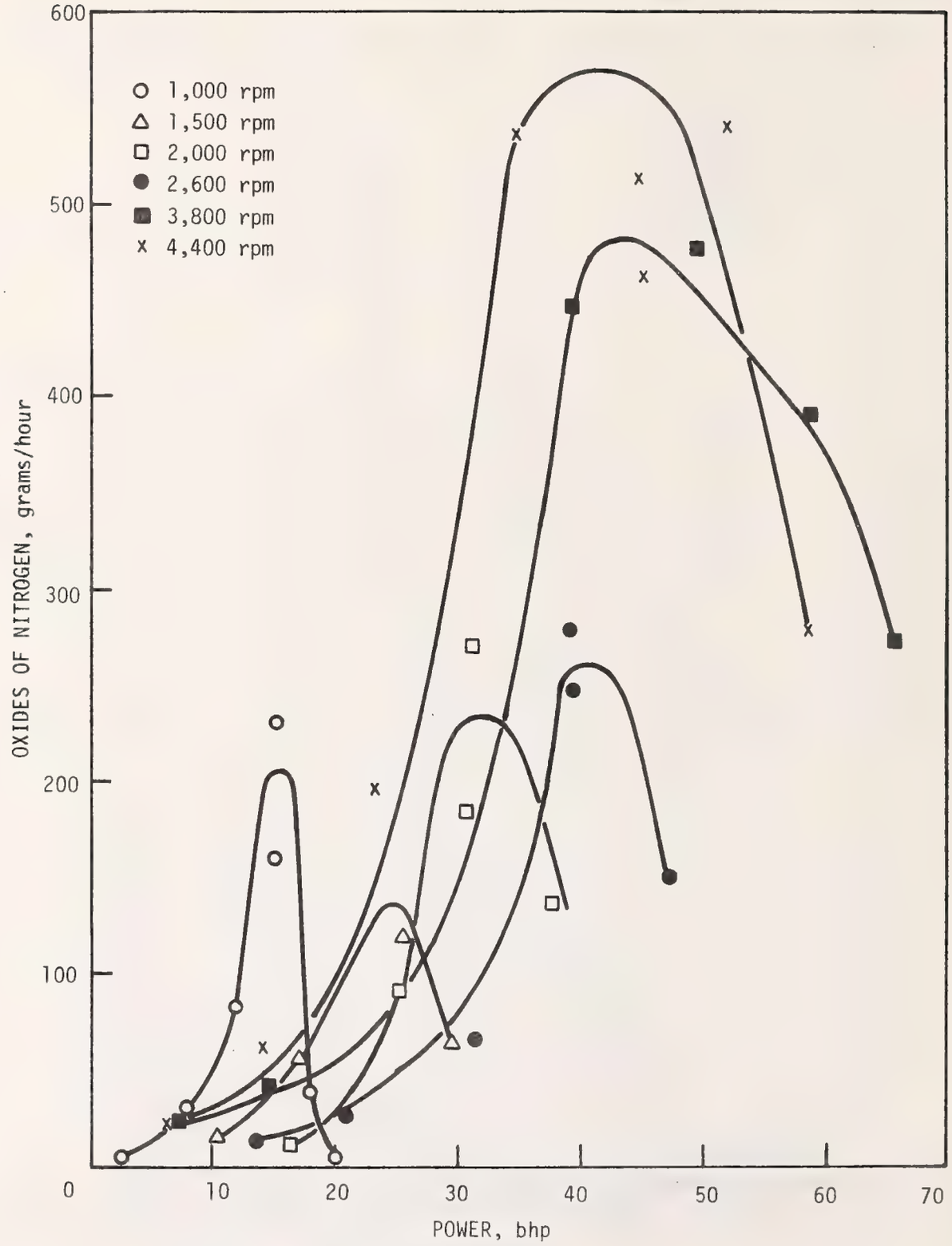


FIGURE 5. Oxides of Nitrogen Emissions versus Power at Various Speed and Load Conditions--Chevrolet Vega 2.3 Liter Engine.

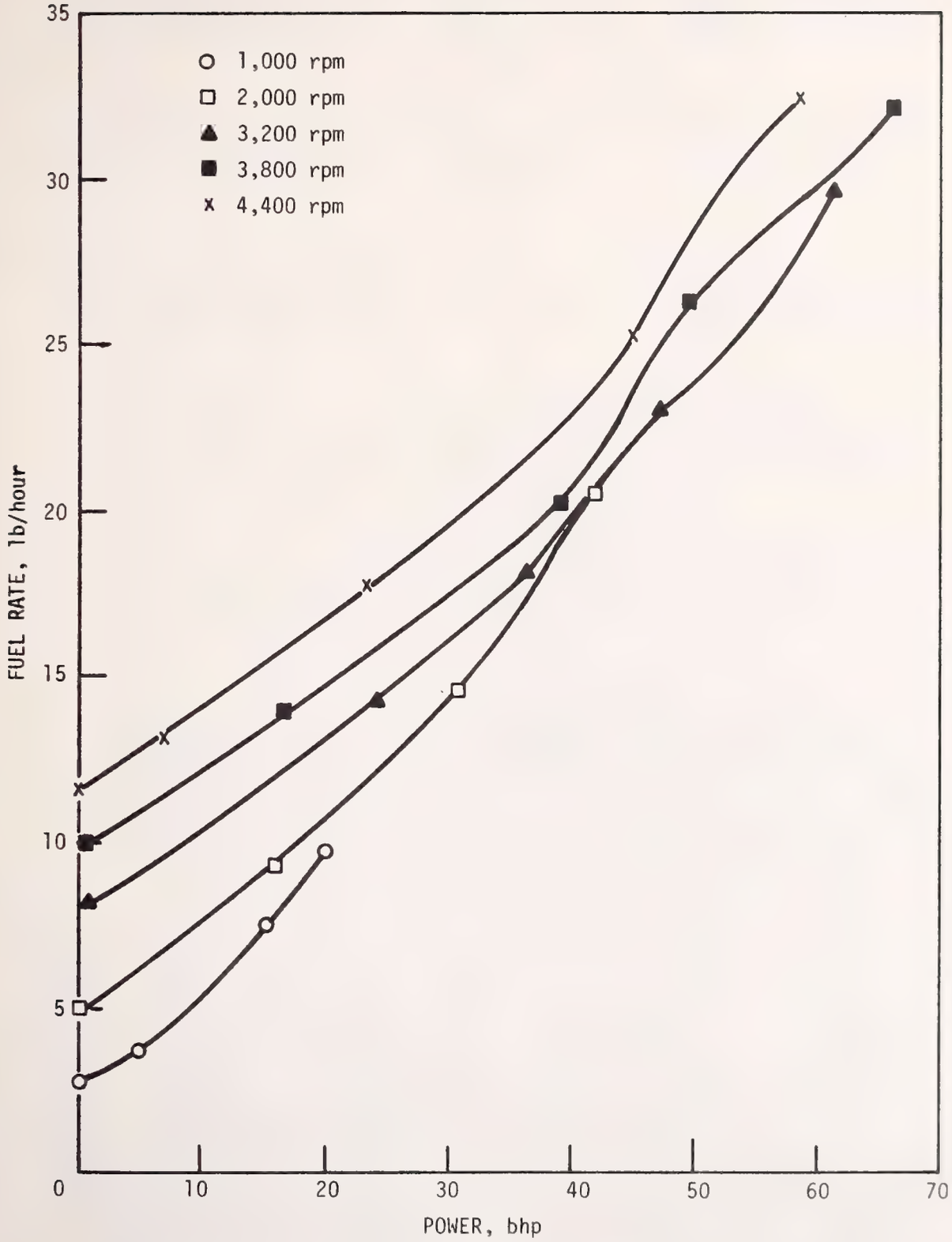


FIGURE 6. Fuel Rate versus Power at Various Speed and Load Conditions--Chevrolet Vega 2.3 Liter Engine.

ENGINE CODE VEGA23

TEST NUMBER	1.1	1.2	2.1	2.2	3.1	3.2
TEST DATE	1/ 3/77	1/ 3/77	1/ 3/77	1/ 3/77	1/ 3/77	1/ 3/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	742.0	742.0	742.0	742.0	742.0	742.0
HUMIDITY, GRAINS/LB	46	46	46	46	46	46
TEMPERATURE, F	80	80	80	80	80	80
ENGINE SPEED, RPM	750	750	750	750	750	750
TORQUE, FT-LB	6.1	6.1	10.0	10.0	20.0	20.0
POWER, BHP*	.9	.9	1.4	1.4	2.9	2.9
FUEL RATE, LB/HR	2.1	2.1	2.1	2.1	2.6	2.6
IGNITION TIMING, DEG BTDC	12.0	12.0	12.0	12.0	12.0	12.0
MANIFOLD VACUUM, IN HG	18.0	18.0	18.0	18.0	16.0	16.0
THROTTLE ANGLE, DEG	.0	.0	1.0	1.0	3.0	3.0
INTAKE MAN. TEMP , F	119	119	127	127	120	120
CONCENTRATIONS, DRY BASIS						
CO, %	.1483	.0025	.1250	.0016	.1095	.0041
CO2, %	13.57	13.77	13.63	14.19	13.52	13.89
O2, %	1.49	1.42	1.46	.88	1.76	1.34
HC, PPMC	1837	111	2193	128	2119	119
NOX, PPM	71	62	93	64	186	139
AIR/FUEL RATIO	15.60	15.81	15.55	15.41	15.79	15.75
EMISSION RATES, G/HR						
CO	20.3	.4	17.0	.2	18.3	.7
HC	12 6	.8	15.0	.9	17.7	1.0
NOX+	1.4	1.2	1.8	1.3	4.5	3.4
OIL TEMPERATURE, F	151	151	176	176	165	165
OIL PRESSURE, PSI	16	16	16	16	16	16
COOLANT TEMPERATURE, F	162	162	176	176	174	174
EXHAUST PRESSURE, IN. H2O	3.0	1.0	3.0	1.0	3.0	2.0
EXHAUST TEMPERATURE, F	595	487	507	459	535	476

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	4.1	4.2	5.1	5.2	6.1	6.2
TEST DATE	1/ 3/77	1/ 3/77	1/ 3/77	1/ 3/77	1/ 3/77	1/ 3/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	742.0	742.0	742.0	742.0	742.0	742.0
HUMIDITY, GRAINS/LB	46	46	46	46	46	46
TEMPERATURE, F	80	80	80	80	80	80
ENGINE SPEED, RPM	750	750	750	750	600	600
TORQUE, FT-LB	30.0	30.0	40.0	40.0	16.3	16.3
POWER, BHP*	4.3	4.3	5.7	5.7	1.9	1.9
FUEL RATE, LB/HR	3.0	3.0	3.3	3.3	1.9	1.9
IGNITION TIMING, DEG BTDC	15.0	15.0	27.0	27.0	12.0	12.0
MANIFOLD VACUUM, IN HG	15.0	15.0	14.0	14.0	16.8	16.8
THROTTLE ANGLE, DEG	4.0	4.0	4.0	4.0	.0	.0
INTAKE MAN. TEMP., F	120	120	120	120	138	138
CONCENTRATIONS, DRY BASIS						
CO, %	.0844	.0021	.0759	.0021	.0963	.0025
CO2, %	13.75	14.19	14.03	14.11	14.04	14.58
O2, %	1.35	.98	1.15	.91	1.13	.41
HC, PPMC	2335	110	2596	104	2810	210
NOX, PPM	509	379	1746	1062	124	81
AIR/FUEL RATIO	15.49	15.49	15.35	15.47	15.25	15.07
EMISSION RATES, G/HR						
CO	15.9	.4	15.5	.4	11.5	.3
HC	22.1	1.0	26.6	1.1	16.8	1.2
NOX+	13.9	10.3	51.7	31.7	2.1	1.4
OIL TEMPERATURE, F	176	176	178	178	165	165
OIL PRESSURE, PSI	17	17	17	17	16	16
COOLANT TEMPERATURE, F	175	175	176	176	170	170
EXHAUST PRESSURE, IN. H2O	3.0	2.0	3.0	2.0	1.0	.0
EXHAUST TEMPERATURE, F	529	520	527	499	446	438

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	7.1	7.2	8.1	8.2	9.1	9.2
TEST DATE	1/14/77	1/14/77	1/ 4/77	1/ 4/77	1/ 4/77	1/ 4/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	754.0	754.0	745.0	745.0	745.0	745.0
HUMIDITY, GRAINS/LB	43	43	46	46	50	50
TEMPERATURE, F	82	82	80	80	80	80
ENGINE SPEED, RPM	1000	1000	1000	1000	1000	1000
TORQUE, FT-LB	106.0	106.0	94.5	94.5	79.0	79.0
POWER, BHP*	19.9	19.9	17.9	17.9	15.0	15.0
FUEL RATE, LB/HR	10.5	9.9	8.3	8.3	7.5	7.5
IGNITION TIMING, DEG BTDC	16.0	16.0	12.0	12.0	10.0	10.0
MANIFOLD VACUUM, IN HG	.0	.0	3.0	3.0	4.0	4.0
THROTTLE ANGLE, DEG	58.0	58.0	22.0	22.0	18.0	18.0
INTAKE MAN. TEMP., F	86	86	102	102	113	113
CONCENTRATIONS, DRY BASIS						
CO, %	4.9859	4.9840	.6638	.2144	.0811	.0017
CO2, %	11.04	10.91	13.96	14.75	13.67	13.92
O2 %	.81	.89	1.00	.00	1.63	1.31
HC, PPMC	2504	409	2261	90	1621	57
NOX, PPM	237	51	1111	526	2343	2239
AIR/FUEL RATIO	12.94	13.13	14.99	14.73	15.83	15.81
EMISSION RATES, G/HR						
CO	2794.8	2670.5	336.9	106.6	39.5	.8
HC	70.5	11.0	57.6	2.3	39.6	1.4
NOX+	19.0	3.9	81.7	37.9	168.3	160.3
OIL TEMPERATURE, F	177	177	192	192	205	205
OIL PRESSURE, PSI	30	30	17	17	17	17
COOLANT TEMPERATURE, F	177	177	179	179	179	179
EXHAUST PRESSURE, IN. H2O	15.0	10.0	11.0	8.0	12.0	9.0
EXHAUST TEMPERATURE, F	755	702	947	754	899	742

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	10.1	10.2	11.1	11.2	12.1	12.2
TEST DATE	1/ 4/77	1/ 4/77	1/ 4/77	1/ 4/77	1/ 4/77	1/ 4/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	745.0	745.0	745.0	745.0	745.0	745.0
HUMIDITY, GRAINS/LB	50	50	50	50	50	50
TEMPERATURE, F	80	80	80	80	80	80
ENGINE SPEED, RPM	1000	1000	1000	1000	1000	1000
TORQUE, FT-LB	63.0	63.0	42.0	42.0	26.3	26.3
POWER, BHP*	11.9	11.9	8.0	8.0	5.0	5.0
FUEL RATE, LB/HR	5.8	5.8	4.5	4.5	3.6	3.6
IGNITION TIMING, DEG BTDC	23.0	23.0	32.0	32.0	32.0	32.0
MANIFOLD VACUUM, IN HG	8.0	8.0	13.0	13.0	17.0	17.0
THROTTLE ANGLE, DEG	10.0	10.0	5.0	5.0	3.0	3.0
INTAKE MAN. TEMP., F	124	124	129	129	121	121
CONCENTRATIONS, DRY BASIS						
CO, %	.0711	.0043	.2390	.0066	.2465	.0050
CO2, %	13.52	13.10	13.32	13.37	13.02	12.99
O2 %	1.56	2 22	1.72	2.02	2.25	2.40
HC PPMC	1752	55	2164	55	1785	203
NOX, PPM	1601	1423	1060	311	925	608
AIR/FUEL RATIO	15.76	16.52	15.73	16.30	16.17	16.62
EMISSION RATES, G/HR						
CO	26.8	1.7	69.1	2.0	58.7	1.2
HC	33.1	1.1	31.4	.8	21.4	2.5
NOX+	88.9	82.9	45.2	13.7	32.5	22.0
OIL TEMPERATURE, F	197	197	191	191	188	188
OIL PPESSURE, PSI	17	17	17	17	16	16
COOLANT TEMPERATURE, F	177	177	178	178	176	176
EXHAUST PRESSURE, IN. H2O	9.0	6.0	6.0	4.0	5.0	3.0
EXHAUST TEMPERATURE, F	797	688	689	599	609	532

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	13.1	13.2	14.1	14.2	15.1	15.2
TEST DATE	1/ 4/77	1/ 4/77	1/14/77	1/14/77	1/ 4/77	1/ 4/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	745.0	745.0	745.4	745.4	745.0	745.0
HUMIDITY, GRAINS/LB	50	50	43	43	50	50
TEMPERATURE, F	80	80	79	79	80	80
ENGINE SPEED, RPM	1000	1000	1500	1500	1500	1500
TORQUE, FT-LB	7.0	7.0	105.0	105.0	90.0	90.0
POWER, BHP*	1.3	1.3	29.8	29.8	25.6	25.6
FUEL RATE, LB/HR	2.8	2.8	15.2	15.4	12.5	12.5
IGNITION TIMING, DEG BTDC	14.0	14.0	11.0	11.0	10.0	10.0
MANIFOLD VACUUM, IN HG	18.0	18.0	.5	.5	7.5	7.5
THROTTLE ANGLE, DEG	2.0	3.0	58.0	58.0	28.0	28.0
INTAKE MAN. TEMP., F	121	121	100	100	112	112
CONCENTRATIONS, DRY BASIS						
CO, %	.1107	.0047	3.8280	3.6925	.8245	.8616
CO2, %	13.01	13.19	12.32	12.47	14.23	14.33
O2, %	2.37	2.31	.19	.06	.31	.08
HC, PPMC	633	39	2124	1531	1678	365
NOX, PPM	76	67	845	525	1790	1090
AIR/FUEL RATIO	16.45	16.52	13.15	13.17	14.55	14.49
EMISSION RATES, G/HR						
CO	21.0	.9	3140.2	3079.6	610.0	634.2
HC	6.0	.4	87.5	64.1	62.4	13.5
NOX+	2.1	1.9	99.4	62.8	195.4	118.4
OIL TEMPERATURE, F	182	182	199	199	187	187
OIL PRESSURE, PSI	16	16	30	30	17	17
COOLANT TEMPERATURE, F	177	177	183	183	181	181
EXHAUST PRESSURE, IN. H2O	4.0	3.0	28.0	20.0	23.0	18.0
EXHAUST TEMPERATURE, F	554	509	1039	893	1003	895

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	16.1	16.2	17.1	17.2	18.1	18.2
TEST DATE	1/ 4/77	1/ 4/77	1/ 4/77	1/ 4/77	1/ 4/77	1/ 4/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	745.0	745.0	745.0	745.0	745.0	745.0
HUMIDITY, GRAINS/LB	50	50	50	50	50	50
TEMPERATURE, F	80	80	80	80	80	80
ENGINE SPEED, RPM	1500	1500	1500	1500	1500	1500
TORQUE, FT-LB	75.0	75.0	60.0	60.0	40.0	40.0
POWER, BHP*	21.3	21.3	17.1	17.1	11.4	11.4
FUEL RATE, LB/HR	11.4	11.4	9.5	9.5	7.0	7.0
IGNITION TIMING, DEG BTDC	10.0	10.0	19.0	19.0	33.0	33.0
MANIFOLD VACUUM, IN HG	5.0	5.0	6.5	6.5	11.0	11.0
THROTTLE ANGLE, DEG	24.0	24.0	18.0	18.0	10.0	10.0
INTAKE MAN. TEMP., F	127	127	162	162	168	168
CONCENTRATIONS, DRY BASIS						
CO, %	.3557	.0045	.1174	.0033	.1488	.0067
CO2, %	14.50	15.02	14.11	14.31	13.93	13.93
O2, %	.47	.10	1.03	88	1.22	1.57
HC, PPMC	1355	18	1137	28	1619	49
NOX, PPM	1235	670	626	623	314	310
AIR/FUEL RATIO	14.87	14.89	15.37	15.44	15.43	15.92
EMISSION RATES, G/HR						
CO	244.5	3.1	70.2	2.0	65.2	3.0
HC	46.8	.6	34.2	.8	35.7	1.1
NOX+	125.2	67.9	55.3	55.2	20.3	20.7
OIL TEMPERATURE, F	207	207	212	212	207	207
OIL PRESSURE, PSI	17	17	17	17	17	17
COOLANT TEMPERATURE, F	179	179	179	179	178	178
EXHAUST PRESSURE, IN. H2O	22.0	16.0	19.0	14.0	11.0	9.0
EXHAUST TEMPERATURE, F	1120	920	1088	870	906	776

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	19.1	19.2	20.1	20.2	21.1	21.2
TEST DATE	1/13/77	1/13/77	1/12/77	1/12/77	1/13/77	1/13/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	744.2	744.2	753.5	753.5	745.0	745.0
HUMIDITY, GRAINS/LB	44	44	38	38	44	44
TEMPERATURE, F	80	79	80	80	79	79
ENGINE SPEED, RPM	1500	1500	1500	1500	1500	1500
TORQUE, FT-LB	25.0	25.0	10.0	10.0	1.2	1.2
POWER, BHP*	7.1	7.1	2.8	2.8	.3	.3
FUEL RATE, LB/HR	5.6	5.6	3.9	3.9	3.6	3.6
IGNITION TIMING, DEG BTDC	33.0	33.0	34.0	34.0	28.0	28.0
MANIFOLD VACUUM, IN HG	14.5	14.5	19.5	19.5	21.0	21.0
THROTTLE ANGLE, DEG	9.0	9.0	4.0	4.0	3.0	3.0
INTAKE MAN. TEMP., F	156	156	153	153	116	116
CONCENTRATIONS, DRY BASIS						
CO, %	.2493	.0154	.4349	.0255	.5357	.0261
CO2, %	14.46	15.00	13.98	14.74	12.53	12.76
O2, %	1.42	.96	.98	.44	3.26	3.20
HC, PPMC	2247	107	1487	100	1595	78
NOX, PPM	146	101	115	68	90	58
AIR/FUEL RATIO	15.42	15.43	15.13	15.09	16.79	17.25
EMISSION RATES, G/HR						
CO	87.8	5.4	105.5	6.1	132.4	6.6
HC	39.7	1.9	18.1	1.2	19.8	1.0
NOX+	7.4	5.1	3.9	2.3	3.2	2.1
OIL TEMPERATURE, F	185	185	186	186	162	162
OIL PRESSURE, PSI	30	30	30	30	31	31
COOLANT TEMPERATURE, F	178	178	179	179	179	179
EXHAUST PRESSURE, IN. H2O	9.0	8.0	5.0	4.0	5.0	3.0
EXHAUST TEMPERATURE, F	707	697	654	642	574	481

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	22.1	22.2	23.1	23.2	24.1	24.2
TEST DATE	1/14/77	1/14/77	1/13/77	1/13/77	1/12/77	1/12/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	745.0	745.0	744.2	744.2	753.5	753.5
HUMIDITY, GRAINS/LB	44	44	44	44	38	38
TEMPERATURE, F	80	80	83	83	79	79
ENGINE SPEED, RPM	2000	2000	2000	2000	2000	2000
TORQUE, FT-LB	110.0	110.0	99.0	99.0	82.0	82.0
POWER, BHP*	41.7	41.7	37.6	37.6	30.6	30.6
FUEL RATE, LB/HR	19.9	20.6	17.4	18.5	14.6	14.6
IGNITION TIMING, DEG BTDC	17.0	17.0	18.0	18.0	17.0	17.0
MANIFOLD VACUUM, IN HG	1.0	1.0	3.0	3.0	4.5	4.5
THROTTLE ANGLE, DEG	58.0	58.0	40.0	40.0	30.0	30.0
INTAKE MAN. TEMP., F	106	106	118	118	134	134
CONCENTRATIONS, DRY BASIS						
CO, %	2.4897	2.8132	2.4757	2.2248	.1300	.0067
CO2, %	13.22	13.10	13.44	13.71	14.27	14.58
O2, %	.23	.10	.17	.09	.84	.59
HC, PPMC	1617	1127	1700	1073	872	33
NOX, PPM	1707	1164	1121	904	1553	1448
AIR/FUEL RATIO	13.79	13.61	13.75	13.86	15.29	15.25
EMISSION RATES, G/HR						
CO	2792.6	3226.8	2416.9	2326.5	118.4	6.1
HC	91.1	64.9	83.3	56.4	39.8	1.5
NOX+	275.5	192.1	157.5	136.0	198.0	183.8
OIL TEMPERATURE, F	215	215	221	221	205	205
OIL PRESSURE, PSI	30	30	32	32	32	32
COOLANT TEMPERATURE, F	184	184	183	183	183	183
EXHAUST PRESSURE, IN. H2O	45.0	35.0	40.0	29.0	30.0	25.0
EXHAUST TEMPERATURE, F	1142	948	1198	940	1045	909

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	25.1	25.2	26.1	26.2	27.1	27.2
TEST DATE	1/13/77	1/13/77	1/ 5/77	1/ 5/77	1/ 5/77	1/ 5/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	744.2	744.2	750.9	750.9	751.4	751.4
HUMIDITY, GRAINS/LB	44	44	37	37	37	37
TEMPERATURE, F	81	81	79	79	78	78
ENGINE SPEED, RPM	2000	2000	2000	2000	2000	2000
TORQUE, FT-LB	66.0	66.0	40.0	40.0	28.0	28.0
POWER, BHP*	25.0	25.0	15.0	15.0	10.5	10.5
FUEL RATE, LB/HR	12.3	12.3	9.3	9.3	7.6	7.6
IGNITION TIMING, DEG BTDC	24.0	24.0	38.0	38.0	38.0	38.0
MANIFOLD VACUUM, IN HG	7.0	7.0	11.5	11.5	12.5	12.5
THROTTLE ANGLE, DEG	25.0	25.0	14.0	14.0	11.0	11.0
INTAKE MAN. TEMP., F	181	188	204	200	203	203
CONCENTRATIONS, DRY BASIS						
CO, %	.1475	.0052	.3611	.0150	.2450	.0020
CO2, %	14.97	15.46	14.33	14.93	13.96	14.41
O2, %	.68	.21	.71	.22	1.24	.89
HC, PPMC	1276	51	1854	70	1815	50
NOX, PPM	956	840	619	320	221	223
AIR/FUEL RATIO	15.09	14.97	14.95	14.95	15.37	15.42
EMISSION RATES, G/HR						
CO	111.4	3.9	204.4	8.4	117.4	1.0
HC	48.4	1.9	52.7	2.0	43.7	1.2
NOX+	104.0	90.3	49.0	25.2	14.8	15.0
OIL TEMPERATURE, F	207	207	208	208	211	211
OIL PRESSURE, PSI	32	32	32	32	32	32
COOLANT TEMPERATURE, F	182	182	180	180	179	179
EXHAUST PRESSURE, IN. H2O	24.0	17.0	15.0	10.0	12.0	8.0
EXHAUST TEMPERATURE, F	1052	854	962	776	932	760

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	28.1	28.2	29.1	29.2	30.1	30.2
TEST DATE	1/ 5/77	1/ 5/77	1/ 5/77	1/ 5/77	1/14/77	1/14/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	750.6	750.6	750.6	750.6	744.2	744.2
HUMIDITY, GRAINS/LB	37	37	37	37	39	42
TEMPERATURE, F	78	78	79	79	79	79
ENGINE SPEED, RPM	2000	2000	2000	2000	2600	2600
TORQUE, FT-LB	11.0	11.0	.0	.0	104.0	104.0
POWER, BHP*	4.1	4.1	.0	.0	51.1	51.2
FUEL RATE, LB/HR	6.2	6.2	4.8	4.8	23.9	24.3
IGNITION TIMING, DEG BTDC	38.0	38.0	38.0	38.0	18.0	18.0
MANIFOLD VACUUM, IN HG	16.0	16.0	20.0	20.0	2.0	2.0
THROTTLE ANGLE, DEG	7.0	7.0	5.0	5.0	58.0	58.0
INTAKE MAN. TEMP., F	186	186	164	164	107	107
CONCENTRATIONS, DRY BASIS						
CO, %	.2708	.0049	.3760	.0105	2.1456	2.0059
CO2, %	13.65	14.38	13.80	14.55	13.85	14.17
O2, %	1.62	1.05	1.41	.86	.14	.13
HC, PPMC	2706	45	2373	32	1476	377
NOX, PPM	112	120	81	87	1797	1508
AIR/FUEL RATIO	15.53	15.52	15.36	15.39	13.92	14.07
EMISSION RATES, G/HR						
CO	107.3	1.9	114.0	3.2	2907.5	2780.8
HC	53.9	.9	36.1	.5	100.4	26.2
NOX+	6.2	6.6	3.4	3.7	343.3	297.8
OIL TEMPERATURE, F	205	205	203	203	212	212
OIL PRESSURE, PSI	32	32	32	32	33	33
COOLANT TEMPERATURE, F	178	178	177	177	180	180
EXHAUST PRESSURE, IN. H2O	10.0	5.0	7.0	4.0	70.0	50.0
EXHAUST TEMPERATURE, F	904	720	840	665	1313	1029

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	31.1	31.2	32.1	32.2	33.1	33.2
TEST DATE	1/ 7/77	1/ 7/77	1/ 7/77	1/ 7/77	1/ 7/77	1/ 7/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	744.2	744.2	744.2	744.2	744.2	744.2
HUMIDITY, GRAINS/LB	44	44	41	44	44	44
TEMPERATURE, F	80	80	80	80	80	80
ENGINE SPEED, RPM	2600	2600	2600	2600	2600	2600
TORQUE, FT-LB	96.0	96.0	80.0	80.0	64.0	64.0
POWER, BHP*	47.3	47.3	39.4	39.4	31.5	31.5
FUEL RATE, LB/HR	23.4	23.4	19.2	19.2	15.6	15.6
IGNITION TIMING, DEG BTDC	16.0	16.0	18.0	18.0	27.0	27.0
MANIFOLD VACUUM, IN HG	3.0	3.0	4.0	4.0	7.0	7.0
THROTTLE ANGLE, DEG	45.0	45.0	36.0	36.0	26.0	26.0
INTAKE MAN. TEMP., F	115	115	128	128	179	179
CONCENTRATIONS, DRY BASIS						
CO, %	1.8758	1.4679	.2616	.0194	.3601	.0295
CO2, %	13.69	14.22	14.52	14.82	14.87	15.44
O2, %	.30	.05	.91	.83	.46	.11
HC, PPMC	1467	227	573	63	1439	78
NOX, PPM	1414	776	1406	1435	1091	484
AIR/FUEL RATIO	14.10	14.22	15.29	15.39	14.85	14.88
EMISSION RATES, G/HR						
CO	2523.7	1986.1	311.9	23.2	338.9	27.7
HC	99.2	15.4	34.3	3.8	68.0	3.7
NOX+	273.8	151.2	237.9	247.5	147.9	65.5
OIL TEMPERATURE, F	205	205	234	234	239	239
OIL PRESSURE, PSI	32	32	30	30	29	29
COOLANT TEMPERATURE, F	183	183	181	181	179	179
EXHAUST PRESSURE, IN. H2O	63.0	45.0	58.0	40.0	39.0	29.0
EXHAUST TEMPERATURE, F	1099	946	1308	1015	1270	943

* - CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	34.1	34.2	35.1	35.2	36.1	36.2
TEST DATE	1/ 7/77	1/ 7/77	1/ 7/77	1/ 7/77	1/ 7/77	1/ 7/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	744.2	744.2	744.2	744.2	744.2	744.2
HUMIDITY, GRAINS/LB	44	44	44	44	44	44
TEMPERATURE, F	80	80	88	88	89	89
ENGINE SPEED, RPM	2600	2600	2600	2600	2600	2600
TORQUE, FT-LB	42.8	42.8	26.7	26.7	10.7	10.7
POWER, BHP*	21.1	21.1	13.3	13.3	5.3	5.3
FUEL RATE, LB/HR	12.2	12.2	9.5	9.5	9.5	9.5
IGNITION TIMING, DEG BTDC	40.0	40.0	43.0	43.0	41.0	41.0
MANIFOLD VACUUM, IN HG	12.0	12.0	14.0	14.0	14.5	14.5
THROTTLE ANGLE, DEG	18.0	18.0	14.0	14.0	13.5	13.0
INTAKE MAN. TEMP., F	209	209	200	200	208	208
CONCENTRATIONS, DRY BASIS						
CO, %	.7876	.7776	.6259	.9209	.6387	.4407
CO2, %	14.70	14.89	14.77	14.78	14.76	15.24
O2, %	.26	.06	.31	.01	.29	.01
HC, PPMC	1856	423	1779	744	1763	192
NOX, PPM	755	539	297	205	301	118
AIR/FUEL RATIO	14.49	14.50	14.58	14.37	14.57	14.62
EMISSION RATES, G/HR						
CO	566.7	558.9	351.4	509.1	358.4	247.3
HC	67.1	15.3	50.2	20.7	49.7	5.4
NOX+	78.2	55.8	24.0	16.3	24.3	9.5
OIL TEMPERATURE, F	236	236	198	198	220	220
OIL PPESSURE, PSI	29	29	32	32	32	32
COOLANT TEMPERATURE, F	178	178	180	180	179	179
EXHAUST PRESSURE, IN. H2O	21.0	16.0	16.0	10.0	14.0	11.0
EXHAUST TEMPERATURE, F	1086	847	916	776	911	786

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	37.1	37.2	38.1	38.2	39.1	39.2
TEST DATE	1/13/77	1/13/77	1/14/77	1/14/77	1/ 7/77	1/ 7/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	742.0	742.0	743.4	743.4	744.2	744.2
HUMIDITY, GRAINS/LB	45	45	45	45	44	44
TEMPERATURE, F	79	79	81	81	91	91
ENGINE SPEED, RPM	2600	2600	2800	2800	2800	2800
TORQUE, FT-LB	.5	.2	101.0	101.0	91.0	91.0
POWER, BHP*	.2	.1	53.7	53.7	48.8	48.8
FUEL RATE, LB/HR	6.4	6.4	25.2	25.8	22.8	22.8
IGNITION TIMING, DEG BTDC	40.0	40.0	19.0	19.0	17.0	17.0
MANIFOLD VACUUM, IN HG	18.5	18.5	2.5	2.5	3.5	3.5
THROTTLE ANGLE, DEG	12.0	12.0	54.0	54.0	45.0	45.0
INTAKE MAN. TEMP., F	195	195	107	107	121	121
CONCENTRATIONS, DRY BASIS						
CO, %	.4617	.1041	1.6765	1.5460	.9109	.2617
CO2, %	12.78	13.31	14.04	14.37	14.33	15.30
O2, %	2.86	2.71	.37	.10	.69	.06
HC, PPMC	2581	46	1180	192	906	46
NOX, PPM	60	24	2197	1283	1501	298
AIR/FUEL RATIO	16.39	16.73	14.29	14.25	14.82	14.75
EMISSION RATES, G/HR						
CO	200.3	45.9	2450.6	2309.1	1250.7	355.9
HC	56.2	1.0	86.6	14.4	62.4	3.2
NOX+	3.8	1.5	462.3	276.0	296.6	58.4
OIL TEMPERATURE, F	190	190	240	240	230	230
OIL PRESSURE, PSI	35	35	35	35	31	31
COOLANT TEMPERATURE, F	179	179	181	181	181	181
EXHAUST PRESSURE, IN. H2O	9.0	6.0	85.0	56.0	72.0	50.0
EXHAUST TEMPERATURE, F	898	778	1328	1042	1303	1013

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	40.1	40.2	41.1	41.2	42.1	42.2
TEST DATE	1/ 7/77	1/ 7/77	1/ 7/77	1/ 7/77	1/10/77	1/10/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	744.2	744.2	744.2	744.2	746.4	746.4
HUMIDITY, GRAINS/LB	44	44	44	44	34	34
TEMPERATURE, F	94	94	96	96	77	77
ENGINE SPEED, RPM	2800	2800	2800	2800	2800	2800
TORQUE, FT-LB	76.0	76.0	61.0	61.0	40.0	40.0
POWER, BHP*	40.9	40.9	32.8	32.8	21.1	21.1
FUEL RATE, LB/HR	20.3	20.3	16.0	16.0	12.8	12.5
IGNITION TIMING, DEG BTDC	19.0	19.0	30.0	30.0	43.0	43.0
MANIFOLD VACUUM, IN HG	4.5	4.5	7.5	7.5	12.5	12.5
THROTTLE ANGLE, DEG	39.0	39.0	28.0	28.0	19.0	19.0
INTAKE MAN. TEMP., F	133	133	189	189	182	208
CONCENTRATIONS, DRY BASIS						
CO, %	.2314	.0137	.2831	0131	.5696	.4264
CO2, %	14.45	14.77	14.92	15.38	14.12	14.49
O2, %	1.13	1.01	.56	.32	.31	.04
HC, PPMC	356	29	1168	59	1780	255
NOX, PPM	1250	1274	1103	989	1083	477
AIR/FUEL RATIO	15.47	15.52	14.97	15.04	14.62	14.64
EMISSION RATES, G/HR						
CO	294.8	17.5	274.6	12.7	433.9	317.2
HC	22.8	1.9	56.9	2.9	68.1	9.5
NOX+	229.2	234.0	153.9	138.3	113.6	48.8
OIL TEMPERATURE, F	242	242	243	243	183	182
OIL PRESSURE, PSI	31	31	31	31	37	37
COOLANT TEMPERATURE, F	181	181	179	179	178	178
EXHAUST PRESSURE, IN. H2O	65.0	46.0	41.0	30.0	21.0	14.0
EXHAUST TEMPERATURE, F	1303	1038	1221	952	879	810

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	43.1	43.2	44.1	44.2	45.1	45.2
TEST DATE	1/10/77	1/10/77	1/12/77	1/12/77	1/12/77	1/12/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	746.4	746.4	753.5	753.5	753.5	753.5
HUMIDITY, GRAINS/LB	34	34	38	38	38	38
TEMPERATURE, F	86	86	81	81	81	81
ENGINE SPEED, RPM	2800	2800	2800	2800	2800	2800
TORQUE, FT-LB	25.0	25.0	10.0	10.0	.0	.0
POWER, BHP*	13.3	13.3	5.2	5.2	.0	.0
FUEL RATE, LB/HR	10.4	10.3	8.4	8.4	7.3	7.3
IGNITION TIMING, DEG BTDC	43.0	43.0	41.0	41.0	41.0	41.♦
MANIFOLD VACUUM, IN HG	15.0	15.0	17.0	17.0	19.0	19.♦
THROTTLE ANGLE, DEG	14.0	14.0	13.0	13.0	12.0	12.♦
INTAKE MAN. TEMP., F	207	207	220	220	250	25♦
CONCENTRATIONS, DRY BASIS						
CO, %	.7989	.7928	.4906	.0831	.3713	.0259
CO2, %	14.05	14.32	14.57	15.20	14.53	15.12
O2, %	.26	.01	.46	.11	.69	.25
HC, PPMC	1541	228	1221	26	1817	34
NOX, PPM	386	154	130	51	78	51
AIR/FUEL RATIO	14.49	14.46	14.78	14.85	14.92	14.96
EMISSION RATES, G/HR						
CO	490.7	481.8	247.9	42.0	164.2	11.4
HC	47.5	7.0	31.0	.6	40.3	.8
NOX+	32.6	12.9	9.2	3.6	4.8	3.1
OIL TEMPERATURE, F	229	229	227	227	225	225
OIL PRESSURE, PSI	34	34	32	32	32	32
COOLANT TEMPERATURE, F	180	180	179	179	178	178
EXHAUST PRESSURE, IN. H2O	15.0	11.0	13.0	10.0	15.0	10.0
EXHAUST TEMPERATURE, F	933	804	962	827	954	837

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	46.1	46.2	47.1	47.2	48.1	48.2
TEST DATE	1/10/77	1/10/77	1/10/77	1/10/77	1/10/77	1/10/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	746.4	746.4	746.4	746.4	746.4	746.4
HUMIDITY, GRAINS/LB	34	34	34	34	34	34
TEMPERATURE, F	95	95	93	94	93	93
ENGINE SPEED, RPM	3200	3200	3200	3200	3200	3200
TORQUE, FT-LB	100.0	100.0	90.0	90.0	75.0	75.0
POWER, BHP*	61.2	61.2	54.9	55.0	45.8	45.8
FUEL RATE, LB/HR	29.6	29.7	25.7	25.7	23.1	23.1
IGNITION TIMING, DEG BTDC	22.0	22.0	20.0	20.0	23.0	23.0
MANIFOLD VACUUM, IN HG	2.5	2.5	3.5	3.5	4.6	4.5
THROTTLE ANGLE, DEG	55.0	55.0	49.0	49.0	42.0	42.0
INTAKE MAN. TEMP., F	114	114	119	119	140	140
CONCENTRATIONS, DRY BASIS						
CO, %	2.1486	1.9450	.6895	.0850	.2275	.0043
CO2, %	13.12	13.42	13.62	14.52	13.60	13.86
O2, %	.34	.08	.77	.25	1.37	1.26
HC, PPMC	1000	278	569	16	257	16
NOX, PPM	2267	1231	2442	1172	1968	1945
AIR/FUEL RATIO	14.06	14.03	15.05	14.98	15.72	15.77
EMISSION RATES, G/HR						
CO	3657.1	3313.8	1089.1	133.0	338.2	6.5
HC	85.5	23.8	45.2	1.3	19.2	1.2
NOX+	531.4	288.8	531.1	252.5	402.9	399.0
OIL TEMPERATURE, F	261	261	220	220	248	248
OIL PRESSURE, PSI	32	32	32	32	32	32
COOLANT TEMPERATURE, F	184	184	185	185	184	184
EXHAUST PRESSURE, IN. H20	110.0	72.0	89.0	62.0	79.0	55.0
EXHAUST TEMPERATURE, F	1424	1065	1359	1028	1385	1055

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	49.1	49.2	50.1	50.2	51.1	51.2
TEST DATE	1/10/77	1/10/77	1/10/77	1/10/77	1/10/77	1/10/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	746.4	746.6	746.4	746.4	746.4	746.4
HUMIDITY, GRAINS/LB	34	33	34	34	34	34
TEMPERATURE, F	83	83	88	88	89	89
ENGINE SPEED, RPM	3200	3200	3200	3200	3200	3200
TORQUE, FT-LB	60.0	60.0	40.0	40.0	25.0	25.0
POWER, BHP*	36.3	36.3	24.3	24.3	15.2	15.2
FUEL RATE, LB/HR	18.1	18.1	14.0	14.0	11.4	11.4
IGNITION TIMING, DEG BTDC	37.0	37.0	48.0	48.0	47.0	47.0
MANIFOLD VACUUM, IN HG	9.0	9.0	12.0	12.0	15.0	15.0
THROTTLE ANGLE, DEG	28.5	28.5	21.0	21.0	16.0	16.0
INTAKE MAN. TEMP., F	175	175	203	203	205	205
CONCENTRATIONS, DRY BASIS						
CO, %	.2488	.0052	.6693	.4683	.6893	.6880
CO2, %	14.29	14.73	14.21	14.66	14.30	14.49
O2, %	.69	.37	.45	.13	.37	.11
HC, PPMC	1008	40	1431	114	1356	216
NOX, PPM	2245	2083	1523	839	655	479
AIR/FUEL RATIO	15.14	15.12	14.72	14.71	14.64	14.58
EMISSION RATES, G/HR						
CO	277.4	5.8	562.9	392.2	467.6	464.1
HC	56.5	2.2	60.4	4.8	46.2	7.3
NOX+	344.8	318.9	176.4	96.8	61.2	44.5
OIL TEMPERATURE, F	197	197	239	239	240	240
OIL PRESSURE, PSI	32	32	32	32	32	32
COOLANT TEMPERATURE, F	182	182	184	184	180	180
EXHAUST PRESSURE, IN. H2O	44.0	30.0	30.0	20.0	20.0	15.0
EXHAUST TEMPERATURE, F	1133	896	1191	909	1078	854

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	52.1	52.2	53.1	53.2	54.1	54.2
TEST DATE	1/10/77	1/10/77	1/10/77	1/10/77	1/10/77	1/10/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	746.4	746.4	746.4	746.4	746.4	746.4
HUMIDITY, GRAINS/LB	34	34	34	34	34	34
TEMPERATURE, F	87	87	89	89	91	91
ENGINE SPEED, RPM	3200	3200	3200	3200	3800	3800
TORQUE, FT-LB	10.8	10.8	1.9	1.9	91.0	91.0
POWER, BHP*	6.6	6.6	1.2	1.2	65.8	65.8
FUEL RATE, LB/HR	9.3	9.3	8.2	8.2	32.2	32.2
IGNITION TIMING, DEG BTDC	47.0	47.0	45.0	45.0	20.0	20.0
MANIFOLD VACUUM, IN HG	17.5	17.5	19.0	19.0	3.0	3.0
THROTTLE ANGLE, DEG	11.5	11.5	11.0	11.0	55.0	55.0
INTAKE MAN. TEMP., F	218	218	232	232	113	113
CONCENTRATIONS, DRY BASIS						
CO, %	.9179	.8520	.8061	.7176	1.7076	1.5753
CO2, %	14.20	14.42	14.30	14.57	13.58	13.92
O2, %	.33	.09	.40	.09	.41	.14
HC, PPMC	1380	303	1311	152	907	159
NOX, PPM	204	137	110	37	2402	1064
AIR/FUEL RATIO	14.50	14.47	14.59	14.54	14.32	14.24
EMISSION RATES, G/HR						
CO	502.1	464.5	392.0	347.2	3211.4	2940.1
HC	37.9	8.3	32.0	3.7	85.7	14.9
NOX+	15.4	10.3	7.4	2.5	622.2	273.5
OIL TEMPERATURE, F	237	237	232	232	258	258
OIL PRESSURE, PSI	32	32	32	32	32	32
COOLANT TEMPERATURE, F	180	180	179	179	184	184
EXHAUST PRESSURE, IN. H2O	20.0	11.0	14.0	10.0	130.0	86.0
EXHAUST TEMPERATURE, F	1020	845	983	858	1443	1085

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	55.1	55.2	56.1	56.2	57.1	57.2
TEST DATE	1/10/77	1/10/77	1/10/77	1/10/77	1/11/77	1/11/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	746.4	746.4	746.4	746.4	753.0	753.0
HUMIDITY, GRAINS/LB	34	34	34	34	33	33
TEMPERATURE, F	93	92	94	93	90	90
ENGINE SPEED, RPM	3800	3800	3800	3800	3800	3800
TORQUE, FT-LB	81.0	81.0	68.0	68.0	54.6	54.6
POWER, BHP*	58.7	58.7	49.3	49.3	39.1	39.1
FUEL RATE, LB/HR	29.3	29.3	26.5	26.6	21.9	20.2
IGNITION TIMING, DEG BTDC	25.0	25.0	25.0	25.0	41.0	41.0
MANIFOLD VACUUM, IN HG	3.5	3.5	4.5	4.5	8.5	8.5
THROTTLE ANGLE, DEG	52.0	52.0	51.0	51.0	48.0	48.0
INTAKE MAN. TEMP., F	122	122	128	122	182	182
CONCENTRATIONS, DRY BASIS						
CO, %	.6806	.0376	.0764	.0022	.2023	.0046
CO2, %	13.96	14.75	13.24	13.17	13.53	13.77
O2, %	.94	.48	2.67	2.66	.76	.61
HC, PPMC	290	24	58	19	641	32
NOX, PPM	2381	1577	1691	1672	2725	2565
AIR/FUEL RATIO	15.19	15.17	16.80	16.85	15.28	15.33
EMISSION RATES, G/HR						
CO	1234.8	67.9	139.3	4.0	278.3	5.9
HC	26.5	2.2	5.3	1.7	44.3	2.0
NOX+	594.8	392.3	424.4	423.5	515.2	447.4
OIL TEMPERATURE, F	270	270	266	266	246	246
OIL PRESSURE, PSI	32	32	32	32	34	34
COOLANT TEMPERATURE, F	183	183	183	183	184	184
EXHAUST PRESSURE, IN. H2O	125.0	83.0	115.0	79.0	58.0	40.0
EXHAUST TEMPERATURE, F	1484	1109	1403	1084	1192	951

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	58.1	58.2	59.1	59.2	60.1	60.2
TEST DATE	1/11/77	1/11/77	1/11/77	1/11/77	1/11/77	1/11/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	753.0	753.0	752.0	752.0	752.0	752.0
HUMIDITY, GRAINS/LB	33	35	35	35	35	35
TEMPERATURE, F	80	80	80	80	80	80
ENGINE SPEED, RPM	3800	3800	3800	3800	3800	3800
TORQUE, FT-LB	36.0	36.0	23.0	23.0	9.0	9.0
POWER, BHP*	25.6	25.6	16.4	16.4	6.4	6.4
FUEL RATE, LB/HR	16.8	16.7	13.9	13.9	11.6	11.7
IGNITION TIMING, DEG BTDC	50.0	50.0	50.0	50.0	50.0	50.0
MANIFOLD VACUUM, IN HG	12.0	12.0	15.0	15.0	17.0	17.0
THROTTLE ANGLE, DEG	24.0	24.0	21.0	21.0	16.0	16.0
INTAKE MAN. TEMP., F	200	200	211	211	146	146
CONCENTRATIONS, DRY BASIS						
CO, %	.4018	.0303	.5622	.4660	.5769	.8813
CO2, %	13.60	14.09	13.64	13.89	13.70	13.70
O2, %	.60	.21	.38	.09	.36	.10
HC, PPMC	1057	22	1031	91	928	274
NOX, PPM	2457	1148	879	226	358	257
AIR/FUEL RATIO	15.01	14.98	14.73	14.66	14.71	14.46
EMISSION RATES, G/HR						
CO	414.9	31.1	472.8	389.3	403.8	608.8
HC	54.8	1.1	43.6	3.8	32.6	9.5
NOX+	348.6	163.2	102.6	26.2	34.8	24.6
OIL TEMPERATURE, F	261	261	254	254	240	240
OIL PRESSURE, PSI	34	34	33	33	35	35
COOLANT TEMPERATURE, F	183	183	183	183	182	182
EXHAUST PRESSURE, IN. H2O	38.0	25.0	27.0	18.0	20.0	14.0
EXHAUST TEMPERATURE, F	1143	927	1076	883	1038	862

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	61.1	61.2	62.1	62.2	63.1	63.2
TEST DATE	1/11/77	1/11/77	1/11/77	1/11/77	1/11/77	1/11/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	752.0	752.0	751.5	751.5	751.5	751.5
HUMIDITY, GRAINS/LB	33	33	33	33	33	33
TEMPERATURE, F	79	79	79	79	78	78
ENGINE SPEED, RPM	3800	3800	4400	4400	4400	4400
TORQUE, FT-LB	.0	.0	71.0	71.0	63.0	63.0
POWER, BHP*	.0	.0	58.4	58.4	51.8	51.8
FUEL RATE, LB/HR	9.7	10.0	32.5	32.5	29.9	29.9
IGNITION TIMING, DEG BTDC	52.0	52.0	30.0	30.0	30.0	30.0
MANIFOLD VACUUM, IN HG	18.5	18.5	4.0	4.0	4.5	4.5
THROTTLE ANGLE, DEG	14.0	14.0	58.0	58.0	50.0	50.0
INTAKE MAN. TEMP., F	153	153	78	78	78	78
CONCENTRATIONS, DRY BASIS						
CO, %	.6286	.5125	.0864	.1370	.1365	.0039
CO2, %	13.91	14.00	14.38	14.63	13.70	13.83
O2, %	.12	.09	.55	.23	1.43	1.48
HC, PPMC	238	54	37	14	51	14
NOX, PPM	93	74	1715	1028	2036	2021
AIR/FUEL RATIO	14.59	14.63	15.20	14.94	15.83	15.93
EMISSION RATES, G/HR						
CO	363.7	305.8	174.1	271.1	264.0	7.7
HC	6.9	1.6	3.8	1.4	5.0	1.4
NOX+	7.4	6.1	475.2	279.5	541.3	540.3
OIL TEMPERATURE, F	246	246	237	237	272	272
OIL PRESSURE, PSI	35	35	35	35	35	35
COOLANT TEMPERATURE, F	180	180	184	184	184	184
EXHAUST PRESSURE, IN. H2O	15.0	10.0	150.0	99.0	135.0	90.0
EXHAUST TEMPERATURE, F	996	872	1417	1112	1404	1128

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	64.1	64.2	65.1	65.2	66.1	66.2
TEST DATE	1/11/77	1/11/77	1/11/77	1/11/77	1/11/77	1/11/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	751.5	751.5	751.5	751.5	751.5	751.5
HUMIDITY, GRAINS/LB	33	33	33	33	33	33
TEMPERATURE, F	82	82	79	79	82	82
ENGINE SPEED, RPM	4400	4400	4400	4400	4400	4400
TORQUE, FT-LB	54.0	54.0	42.0	42.0	27.0	28.0
POWER, BHP*	44.6	44.6	34.6	34.6	22.3	23.1
FUEL RATE, LB/HR	26.0	26.0	20.7	20.7	17.7	17.7
IGNITION TIMING, DEG BTDC	40.0	40.0	51.0	51.0	52.0	52.0
MANIFOLD VACUUM, IN HG	7.0	7.0	10.2	10.5	13.5	13.5
THROTTLE ANGLE, DEG	38.5	38.5	30.5	31.0	25.0	25.0
INTAKE MAN. TEMP., F	78	78	182	182	195	195
CONCENTRATIONS, DRY BASIS						
CO, %	.1608	.0071	.0426	.0060	.0751	.6961
CO2, %	14.26	14.15	14.10	14.13	14.73	14.30
O2, %	.74	.87	.92	.98	.15	.14
HC, PPMC	218	17	141	23	25	187
NOX, PPM	2402	2274	2880	2966	1059	1366
AIR/FUEL RATIO	15.30	15.49	15.52	15.59	14.91	14.62
EMISSION RATES, G/HR						
CO	260.8	11.7	55.9	7.9	80.6	733.4
HC	17.8	1.4	9.3	1.5	1.4	9.9
NOX+	535.8	514.0	519.4	537.3	156.2	197.8
OIL TEMPERATURE, F	275	275	258	258	268	268
OIL PRESSURE, PSI	32	32	32	32	32	32
COOLANT TEMPERATURE, F	184	184	184	184	183	183
EXHAUST PRESSURE, IN. H20	92.0	62.0	62.0	40.0	45.0	30.0
EXHAUST TEMPERATURE, F	1355	1051	1201	952	1211	945

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	67.1	67.2	68.1	68.2	69.1	69.2
TEST DATE	1/11/77	1/11/77	1/11/77	1/11/77	1/11/77	1/11/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	751.5	751.5	751.5	751.5	751.5	751.5
HUMIDITY, GRAINS/LB	33	33	33	33	33	33
TEMPERATURE, F	82	82	80	80	79	79
ENGINE SPEED, RPM	4400	4400	4400	4400	4400	4400
TORQUE, FT-LB	17.0	17.0	7.0	7.0	.0	.0
POWER, BHP*	14.0	14.0	5.8	5.8	.0	.0
FUEL RATE, LB/HR	15.1	15.1	12.7	12.7	11.5	11.6
IGNITION TIMING, DEG BTDC	52.0	52.0	54.0	54.0	54.0	54.0
MANIFOLD VACUUM, IN HG	15.5	15.5	17.0	17.0	18.0	18.0
THROTTLE ANGLE, DEG	22.0	22.0	18.5	18.5	17.0	17.0
INTAKE MAN. TEMP., F	210	211	203	203	205	205
CONCENTRATIONS, DRY BASIS						
CO, %	.6055	.5210	.7942	.6267	.8560	.6560
CO2, %	14.36	14.49	14.26	14.47	14.39	14.57
O2, %	.15	.11	.13	.09	.12	.08
HC, PPMC	488	151	378	135	411	119
NOX, PPM	744	506	311	240	181	107
AIR/FUEL RATIO	14.62	14.66	14.52	14.59	14.48	14.57
EMISSION RATES, G/HR						
CO	544.3	469.1	595.3	471.4	582.4	449.4
HC	22.0	6.8	14.2	5.1	14.0	4.1
NOX+	92.0	62.6	32.0	24.8	17.0	10.1
OIL TEMPERATURE, F	267	267	263	263	261	261
OIL PRESSURE, PSI	32	32	32	32	32	32
COOLANT TEMPERATURE, F	184	184	180	180	180	180
EXHAUST PRESSURE, IN. H2O	30.0	20.0	25.0	15.0	20.0	12.0
EXHAUST TEMPERATURE, F	1130	902	1085	867	1063	860

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	70.1	70.2	71.1	71.2	72.1	72.2
TEST DATE	1/11/77	1/11/77	1/11/77	1/11/77	1/11/77	1/11/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	751.9	751.9	751.9	751.9	751.9	751.9
HUMIDITY, GRAINS/LB	33	33	33	33	33	33
TEMPERATURE, F	78	78	79	79	79	79
ENGINE SPEED, RPM	1000	1000	1000	1000	1000	1000
TORQUE, FT-LB	79.0	79.0	42.0	42.0	26.3	26.3
POWER, BHP*	14.8	14.8	7.9	7.9	4.9	4.9
FUEL RATE, LB/HR	7.6	7.6	4.5	4.5	3.3	3.3
IGNITION TIMING, DEG BTDC	20.0	20.0	35.0	35.0	30.0	30.0
MANIFOLD VACUUM, IN HG	6.0	6.0	13.5	13.5	17.5	17.5
THROTTLE ANGLE, DEG	14.0	14.0	6.0	6.0	4.0	4.0
INTAKE MAN. TEMP., F	108	108	142	142	130	130
CONCENTRATIONS, DRY BASIS						
CO, %	.0146	.0035	.0549	.0037	.0242	.0047
CO2, %	13.97	13.83	14.88	14.93	13.90	14.08
O2, %	1.69	1.84	.57	.50	1.88	1.79
HC, PPMC	289	93	691	76	409	81
NOX, PPM	1677	1704	674	791	585	526
AIR/FUEL RATIO	16.02	16.17	15.12	15.16	16.10	16.07
EMISSION RATES, G/HR						
CO	7.2	1.8	15.0	1.0	5.3	1.0
HC	7.2	2.3	9.5	1.1	4.5	.9
NOX+	113.9	116.9	25.3	29.8	17.6	15.7
OIL TEMPERATURE, F	144	144	184	184	186	186
OIL PRESSURE, PSI	32	32	30	30	29	29
COOLANT TEMPERATURE, F	167	167	179	179	178	178
EXHAUST PRESSURE, IN. H2O	10.0	9.0	7.0	5.0	5.0	3.0
EXHAUST TEMPERATURE, F	664	558	763	663	632	572

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	73.1	73.2	74.1	74.2	75.1	75.2
TEST DATE	1/11/77	1/11/77	1/12/77	1/12/77	1/12/77	1/12/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	751.9	751.9	755.5	755.5	755.5	755.5
HUMIDITY, GRAINS/LB	33	33	35	35	35	35
TEMPERATURE, F	78	78	91	91	85	85
ENGINE SPEED, RPM	1000	1000	1000	1000	1500	1500
TORQUE, FT-LB	10.5	10.5	2.0	2.0	75.0	75.0
POWER, BHP*	2.0	2.0	.4	.4	21.1	21.1
FUEL RATE, LB/HR	3.2	3.2	2.7	2.7	11.4	11.5
IGNITION TIMING, DEG BTDC	24.0	24.0	11.0	11.0	12.0	12.0
MANIFOLD VACUUM, IN HG	19.5	19.5	19.5	19.5	4.0	4.0
THROTTLE ANGLE, DEG	3.0	3.0	3.0	3.0	26.0	26.0
INTAKE MAN. TEMP., F	123	123	149	149	139	139
CONCENTRATIONS, DRY BASIS						
CO, %	.0310	.0058	.0238	.0051	.0375	.0040
CO2, %	13.66	13.64	10.89	10.80	13.41	13.71
O2, %	2.20	2.26	5.48	5.42	1.25	1.00
HC, PPMC	182	51	36	31	219	34
NOX, PPM	133	123	59	51	1326	1272
AIR/FUEL RATIO	16.36	16.44	19.72	19.73	15.73	15.57
EMISSION RATES, G/HR						
CO	6.5	1.2	5.3	1.1	27.6	3.0
HC	1.9	.5	.4	.3	8.1	1.3
NOX+	3.9	3.6	1.8	1.6	135.3	129.5
OIL TEMPERATURE, F	184	185	183	183	203	203
OIL PRESSURE, PSI	28	28	28	28	30	30
COOLANT TEMPERATURE, F	176	176	177	177	183	183
EXHAUST PRESSURE, IN. H2O	5.0	4.0	5.0	3.0	23.0	16.0
EXHAUST TEMPERATURE, F	548	537	627	604	1010	923

*, CORRECTED SAE J816B
+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	76.1	76.2	77.1	77.2	79.1	79.2
TEST DATE	1/12/77	1/12/77	1/12/77	1/12/77	1/12/77	1/12/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	755.5	755.5	753.5	753.5	753.5	753.5
HUMIDITY, GRAINS/LB	35	35	35	35	38	38
TEMPERATURE, F	80	80	79	79	80	79
ENGINE SPEED, RPM	1500	1500	1500	1500	1500	1500
TORQUE, FT-LB	40.0	40.0	25.0	25.0	.0	.0
POWER, BHP*	11.2	11.2	7.0	7.0	.0	.0
FUEL RATE, LB/HR	7.1	7.1	5.7	5.7	3.4	3.4
IGNITION TIMING, DEG BTDC	34.0	34.0	34.0	34.0	30.0	30.0
MANIFOLD VACUUM, IN HG	11.0	11.0	14.0	14.0	21.0	21.0
THROTTLE ANGLE, DEG	13.0	13.0	9.0	9.0	4.0	4.0
INTAKE MAN. TEMP., F	179	179	101	101	131	131
CONCENTRATIONS, DRY BASIS						
CO, %	.0874	.0036	.0975	.0060	.2208	.0068
CO2, %	12.10	10.94	10.43	9.87	13.59	14.13
O2, %	3.38	5.10	5.64	6.64	1.74	1.36
HC, PPMC	33	30	88	49	1748	73
NOX, PPM	253	227	130	111	102	97
AIR/FUEL RATIO	17.49	19.39	19.99	21.40	15.75	15.75
EMISSION RATES, G/HR						
CO	44.9	2.1	46.0	3.0	47.9	1.5
HC	.8	.9	2.1	1.2	19.0	.8
NOX+	18.0	18.0	8.5	7.8	3.1	2.9
OIL TEMPERATURE, F	211	211	195	195	192	192
OIL PRESSURE, PSI	30	30	30	30	30	30
COOLANT TEMPERATURE, F	179	179	182	180	178	178
EXHAUST PRESSURE, IN. H2O	12.0	10.0	10.0	7.0	5.0	3.0
EXHAUST TEMPERATURE, F	895	795	752	750	665	633

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	81.1	81.2	82.1	82.2	83.1	83.2
TEST DATE	1/12/77	1/12/77	1/12/77	1/12/77	1/12/77	1/12/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	753.5	753.5	753.5	753.5	753.5	753.5
HUMIDITY, GRAINS/LB	38	38	38	38	38	38
TEMPERATURE, F	79	79	80	80	80	80
ENGINE SPEED, RPM	2000	2000	2000	2000	2000	2000
TORQUE, FT-LB	44.0	44.0	27.5	27.5	11.0	11.0
POWER, BHP*	16.4	16.4	10.3	10.3	4.1	4.1
FUEL RATE, LB/HR	9.0	9.0	7.7	7.7	6.1	6.1
IGNITION TIMING, DEG BTDC	40.0	40.0	39.0	39.0	37.0	37.0
MANIFOLD VACUUM, IN HG	11.5	11.5	13.5	13.5	16.5	16.5
THROTTLE ANGLE, DEG	16.0	16.0	14.0	14.0	10.0	10.0
INTAKE MAN. TEMP., F	197	197	203	203	192	192
CONCENTRATIONS, DRY BASIS						
CO, %	.3578	.1079	.2330	.0053	.3001	.0049
CO2, %	14.48	15.07	14.20	14.67	13.87	14.68
O2, %	.59	.11	1.11	.73	1.56	.74
HC, PPMC	1596	41	1815	58	3839	72
NOX, PPM	499	126	170	176	93	90
AIR/FUEL RATIO	14.90	14.84	15.28	15.30	15.34	15.30
EMISSION RATES, G/HR						
CO	194.9	58.3	112.4	2.5	113.9	1.8
HC	43.7	1.1	44.0	1.4	73.2	1.4
NOX+	38.0	9.6	11.5	11.9	4.9	4.8
OIL TEMPERATURE, F	188	188	209	209	209	209
OIL PRESSURE, PSI	32	32	32	32	32	32
COOLANT TEMPERATURE, F	178	178	179	179	179	179
EXHAUST PRESSURE, IN. H2O	15.0	10.0	12.0	10.0	10.0	7.0
EXHAUST TEMPERATURE, F	882	762	917	771	890	725

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	84.1	84.2	85.1	85.2	86.1	86.2
TEST DATE	1/12/77	1/12/77	1/12/77	1/12/77	1/12/77	1/12/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	753.5	753.5	753.5	753.5	753.5	753.5
HUMIDITY, GRAINS/LB	38	38	38	38	38	38
TEMPERATURE, F	80	80	89	89	82	82
ENGINE SPEED, RPM	2000	2000	2600	2600	2600	2600
TORQUE, FT-LB	.0	.0	80.0	80.0	42.8	42.8
POWER, BHP*	.0	.0	39.2	39.2	20.8	20.8
FUEL RATE, LB/HR	5.0	5.0	19.0	19.0	11.1	11.1
IGNITION TIMING, DEG BTDC	39.0	39.0	17.0	17.0	40.0	40.0
MANIFOLD VACUUM, IN HG	19.0	19.0	5.0	5.0	12.0	12.0
THROTTLE ANGLE, DEG.	8.0	8.0	37.0	37.0	19.0	19.0
INTAKE MAN. TEMP., F	187	187	146	146	209	209
CONCENTRATIONS, DRY BASIS						
CO, %	.3285	.0089	.1141	.0045	.5765	.2713
CO2, %	13.82	14.58	14.31	14.40	14.54	14.97
O2, %	1.56	.82	1.03	1.06	.41	.09
HC, PPMC	3046	69	397	24	1662	84
NOX, PPM	79	66	1623	1661	1000	273
AIR/FUEL RATIO	15.41	15.36	15.47	15.58	14.70	14.75
EMISSION RATES, G/HR						
CO	104.4	2.8	136.3	5.4	380.8	179.5
HC	48.6	1.1	23.8	1.5	55.1	2.8
NOX+	3.5	2.9	271.6	279.7	92.5	25.3
OIL TEMPERATURE, F	207	207	221	221	234	234
OIL PRESSURE, PSI	32	32	32	32	30	30
COOLANT TEMPERATURE, F	178	178	184	184	182	182
EXHAUST PRESSURE, IN. H2O	9.0	5.0	49.0	35.0	21.0	15.0
EXHAUST TEMPERATURE, F	880	708	1129	961	1152	887

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	87.1	87.2	88.1	88.2	89.1	89.2
TEST DATE	1/12/77	1/12/77	1/12/77	1/12/77	1/12/77	1/12/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	753.5	753.5	753.5	753.5	753.5	753.5
HUMIDITY, GRAINS/LB	38	38	38	38	38	38
TEMPERATURE, F	81	81	79	79	78	78
ENGINE SPEED, RPM	2600	2600	2600	2600	2600	2600
TORQUE, FT-LB	26.7	26.7	10.7	10.7	.0	.0
POWER, BHP*	13.0	13.0	5.2	5.2	.0	.0
FUEL RATE, LB/HR	9.7	9.7	7.6	7.6	6.5	6.5
IGNITION TIMING, DEG BTDC	40.0	40.0	42.0	42.0	40.0	40.0
MANIFOLD VACUUM, IN HG	15.0	15.0	17.0	17.0	19.0	19.0
THROTTLE ANGLE, DEG	16.0	16.0	13.0	13.0	11.0	11.0
INTAKE MAN. TEMP., F	212	212	204	204	211	211
CONCENTRATIONS, DRY BASIS						
CO, %	.3728	.1338	.3418	.0206	.5954	.0863
CO2, %	14.55	15.10	14.41	14.98	14.35	15.10
O2, %	.57	.10	.78	.33	.69	.17
HC, PPMC	1397	27	1314	48	1785	41
NOX, PPM	351	50	111	77	73	37
AIR/FUEL RATIO	14.90	14.82	15.05	15.01	14.83	14.88
EMISSION RATES, G/HR						
CO	218.0	77.5	158.8	9.5	232.2	33.7
HC	41.0	.8	30.7	1.1	35.0	.8
NOX+	28.7	4.0	7.2	5.0	4.0	2.0
OIL TEMPERATURE, F	231	231	178	178	208	208
OIL PRESSURE, PSI	30	30	35	35	35	35
COOLANT TEMPERATURE, F	181	181	179	179	180	180
EXHAUST PRESSURE, IN. H2O	15.0	11.0	10.0	9.0	10.0	7.0
EXHAUST TEMPERATURE, F	1004	812	771	761	910	795

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	90.1	90.2	91.1	91.2	92.1	92.2
TEST DATE	1/12/77	1/12/77	1/12/77	1/12/77	1/12/77	1/12/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	753.5	753.5	753.5	753.5	753.5	753.5
HUMIDITY, GRAINS/LB	38	38	38	38	38	38
TEMPERATURE, F	82	82	80	80	81	81
ENGINE SPEED, RPM	2800	2800	2800	2800	2800	2800
TORQUE, FT-LB	76.0	76.0	40.0	40.0	25.0	25.0
POWER, BHP*	39.8	39.8	20.9	20.9	13.1	13.1
FUEL RATE, LB/HR	20.8	20.8	12.3	12.3	10.2	10.2
IGNITION TIMING, DEG BTDC	18.0	18.0	42.0	42.0	41.0	41.0
MANIFOLD VACUUM, IN HG	5.0	5.0	13.0	13.0	14.0	14.0
THROTTLE ANGLE, DEG	18.0	18.0	20.0	22.0	18.0	18.0
INTAKE MAN. TEMP., F	269	269	197	197	250	250
CONCENTRATIONS, DRY BASIS						
CO, %	.0896	.0056	.4282	.2783	.4975	.4184
CO2, %	14.18	14.36	14.65	15.10	14.63	14.96
O2, %	1.12	1.13	.39	.06	.38	.04
HC, PPMC	267	20	1541	91	1368	44
NOX, PPM	1322	1340	860	286	347	90
AIR/FUEL RATIO	15.56	15.63	14.76	14.73	14.72	14.66
EMISSION RATES, G/HR						
CO	118.1	7.4	315.6	204.2	302.3	252.5
HC	17.7	1.3	57.0	3.3	41.8	1.3
NOX+	244.1	248.1	88.7	29.3	29.5	7.6
OIL TEMPERATURE, F	233	233	202	202	225	225
OIL PRESSURE, PSI	32	32	35	35	32	32
COOLANT TEMPERATURE, F	183	183	173	173	181	181
EXHAUST PRESSURE, IN. H2O	60.0	42.0	20.0	15.0	18.0	12.0
EXHAUST TEMPERATURE, F	1250	1023	979	849	1003	836

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	95.1	95.2	96.1	96.2	97.1	97.2
TEST DATE	1/12/77	1/12/77	1/12/77	1/12/77	1/12/77	1/12/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	753.5	753.5	753.5	753.5	753.5	753.5
HUMIDITY, GRAINS/LB	38	38	38	38	38	38
TEMPERATURE, F	82	82	83	83	83	83
ENGINE SPEED, RPM	3200	3200	3200	3200	3200	3200
TORQUE, FT-LB	75.0	75.0	40.0	40.0	25.0	25.0
POWER, BHP*	44.9	44.9	24.0	24.0	15.0	15.0
FUEL RATE, LB/HR	22.1	22.1	14.6	14.6	12.1	12.1
IGNITION TIMING, DEG BTDC	21.0	21.0	47.0	47.0	46.0	46.0
MANIFOLD VACUUM, IN HG	5.0	5.0	12.5	12.5	15.0	15.0
THROTTLE ANGLE, DEG	43.0	43.0	23.0	23.0	19.0	19.0
INTAKE MAN. TEMP., F	119	119	220	220	220	220
CONCENTRATIONS, DRY BASIS						
CO, %	.1543	.0049	.5741	.1963	.6476	.4773
CO2, %	14.24	14.44	14.66	15.19	14.67	15.00
O2, %	1.16	1.09	.37	.07	.29	.06
HC, PPMC	282	17	1440	60	1277	96
NOX, PPM	1497	1596	1333	248	434	266
AIR/FUEL RATIO	15.55	15.61	14.70	14.78	14.61	14.65
EMISSION RATES, G/HR						
CO	215.7	6.9	499.3	171.1	466.3	343.8
HC	19.8	1.2	62.9	2.6	46.2	3.5
NOX+	293.0	313.2	162.4	30.2	43.8	26.8
OIL TEMPERATURE, F	245	245	252	252	245	245
OIL PRESSURE, PSI	32	32	32	32	32	32
COOLANT TEMPERATURE, F	183	183	182	182	178	178
EXHAUST PRESSURE, IN. H2O	75.0	49.0	33.0	22.0	20.0	15.0
EXHAUST TEMPERATURE, F	1282	1038	1229	957	1058	874

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	98.1	98.2	99.1	99.2	100.1	100.2
TEST DATE	1/13/77	1/13/77	1/13/77	1/13/77	1/13/77	1/13/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	744.2	744.2	744.2	744.2	744.2	744.2
HUMIDITY, GRAINS/LB	48	48	45	45	54	54
TEMPERATURE, F	80	80	80	81	85	85
ENGINE SPEED, RPM	3200	3200	3200	3200	3800	3800
TORQUE, FT-LB	10.0	10.0	1.5	1.5	68.0	68.0
POWER, BHP*	6.1	6.1	.9	.9	49.3	49.3
FUEL RATE, LB/HR	9.2	9.3	8.0	8.1	26.0	26.1
IGNITION TIMING, DEG BTDC	47.0	47.0	47.0	47.0	27.0	27.0
MANIFOLD VACUUM, IN HG	17.0	17.0	18.0	18.0	3.5	3.5
THROTTLE ANGLE, DEG	15.0	15.0	13.5	13.5	52.0	52.0
INTAKE MAN. TEMP., F	98	98	100	100	149	149
CONCENTRATIONS, DRY BASIS						
CO, %	.4544	.0654	.4704	.0434	.0682	.0035
CO2, %	13.85	14.01	13.54	13.70	12.64	12.87
O2, %	.95	1.07	1.34	1.48	2.53	2.38
HC, PPMC	902	23	1034	23	65	18
NOX, PPM	200	69	118	78	1741	1776
AIR/FUEL RATIO	15.16	15.53	15.42	15.85	16.79	16.69
EMISSION RATES, G/HR						
CO	259.8	38.4	238.2	22.9	122.5	6.2
HC	25.9	.7	26.3	.6	5.8	1.6
NOX+	16.8	5.9	8.6	6.0	467.7	476.6
OIL TEMPERATURE, F	221	221	234	234	249	249
OIL PRESSURE, PSI	35	35	35	35	35	35
COOLANT TEMPERATURE, F	180	180	180	180	184	184
EXHAUST PRESSURE, IN. H2O	15.0	10.0	13.0	9.0	115.0	76.0
EXHAUST TEMPERATURE, F	997	856	1039	887	1396	1085

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	101.1	101.2	102.1	102.2	103.1	103.2
TEST DATE	1/13/77	1/13/77	1/13/77	1/13/77	1/13/77	1/13/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	744.2	744.2	744.2	744.2	744.2	744.2
HUMIDITY, GRAINS/LB	49	54	52	52	52	52
TEMPERATURE, F	86	86	83	83	85	85
ENGINE SPEED, RPM	3800	3800	3800	3800	3800	3800
TORQUE, FT-LB	36.0	36.0	23.0	23.0	9.0	9.0
POWER, BHP*	26.1	26.1	16.6	16.6	6.5	6.5
FUEL RATE, LB/HR	16.7	16.7	13.8	14.0	11.2	11.2
IGNITION TIMING, DEG BTDC	52.0	52.0	52.0	52.0	52.0	52.0
MANIFOLD VACUUM, IN HG	12.0	12.0	14.5	14.5	17.0	17.0
THROTTLE ANGLE, DEG	26.0	28.0	27.5	27.5	18.0	18.0
INTAKE MAN. TEMP., F	147	147	118	115	124	124
CONCENTRATIONS, DRY BASIS						
CO, %	.5226	.0683	.6909	.6290	.8986	.8395
CO2, %	14.44	15.07	14.05	14.33	14.41	14.58
O2, %	.47	.08	.39	.07	.27	.06
HC, PPMC	1046	24	1028	103	1057	208
NOX, PPM	1727	322	776	492	260	175
AIR/FUEL RATIO	14.84	14.84	14.68	14.58	14.50	14.47
EMISSION RATES, G/HR						
CO	526.6	68.7	572.5	522.7	591.7	550.8
HC	52.9	1.2	42.8	4.3	34.9	6.9
NOX+	254.9	48.5	95.7	60.8	25.4	17.1
OIL TEMPERATURE, F	265	265	253	253	257	257
OIL PRESSURE, PSI	34	34	35	35	33	33
COOLANT TEMPERATURE, F	182	182	180	180	179	179
EXHAUST PRESSURE, IN. H2O	40.0	25.0	28.0	19.0	20.0	13.0
EXHAUST TEMPERATURE, F	1242	941	1173	902	1095	861

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	104.1	104.2	105.1	105.2	106.1	106.2
TEST DATE	1/13/77	1/13/77	1/13/77	1/13/77	1/13/77	1/13/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	744.2	744.2	744.2	744.2	744.2	744.2
HUMIDITY, GRAINS/LB	57	57	47	47	43	43
TEMPERATURE, F	84	84	82	82	84	84
ENGINE SPEED, RPM	3800	3800	4400	4400	4400	4400
TORQUE, FT-LB	1.5	1.5	54.0	54.0	28.0	28.0
POWER, BHP*	1.1	1.1	45.1	45.1	23.4	23.4
FUEL RATE, LB/HR	10.0	9.8	26.1	25.2	17.9	17.9
IGNITION TIMING, DEG BTDC	52.0	52.0	37.0	37.0	52.0	52.0
MANIFOLD VACUUM, IN HG	18.0	18.0	6.5	6.5	13.0	13.0
THROTTLE ANGLE, DEG	17.0	17.0	42.0	42.0	27.0	27.0
INTAKE MAN. TEMP., F	125	125	165	165	198	198
CONCENTRATIONS, DRY BASIS						
CO, %	.4037	.0080	.1430	.0057	.4962	.0305
CO2, %	14.49	14.83	14.12	14.56	14.45	14.94
O2, %	.47	.41	1.25	.73	.45	.09
HC, PPMC	676	15	142	17	869	18
NOX, PPM	167	144	1890	2018	1716	564
AIR/FUEL RATIO	14.88	15.08	15.66	15.37	14.86	14.88
EMISSION RATES, G/HR						
CO	243.7	4.8	238.5	9.0	537.0	32.9
HC	20.5	.4	11.9	1.3	47.2	1.0
NOX+	15.3	13.1	458.7	462.9	265.5	87.1
OIL TEMPERATURE, F	249	249	242	242	271	271
OIL PRESSURE, PSI	33	33	35	35	33	33
COOLANT TEMPERATURE, F	179	179	185	185	182	182
EXHAUST PRESSURE, IN. H2O	17.0	10.0	90.0	60.0	44.0	30.0
EXHAUST TEMPERATURE, F	1062	873	1264	1003	1285	945

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	107.1	107.2	108.1	108.2	109.1	109.2
TEST DATE	1/13/77	1/13/77	1/13/77	1/13/77	1/13/77	1/13/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	744.2	744.2	744.2	744.2	744.2	744.2
HUMIDITY, GRAINS/LB	44	44	44	44	44	44
TEMPERATURE, F	84	84	83	83	83	83
ENGINE SPEED, RPM	4400	4400	4400	4400	4400	4400
TORQUE, FT-LB	17.5	17.5	8.0	8.0	1.5	1.5
POWER, BHP*	14.6	14.6	6.7	6.7	1.3	1.3
FUEL RATE, LB/HR	15.5	15.5	13.1	13.2	11.8	11.9
IGNITION TIMING, DEG BTDC	52.0	52.0	52.0	52.0	53.0	53.0
MANIFOLD VACUUM, IN HG	15.0	15.0	16.5	16.5	17.5	17.5
THROTTLE ANGLE, DEG	25.0	25.0	22.0	22.0	19.0	19.0
INTAKE MAN. TEMP., F	208	208	207	207	207	207
CONCENTRATIONS, DRY BASIS						
CO, %	.7134	.3498	.6842	.2736	.3965	.2623
CO2, %	14.39	14.83	14.38	14.81	14.32	14.70
O2, %	.33	.08	.30	.04	.39	.06
HC, PPMC	841	55	571	21	352	23
NOX, PPM	872	325	440	96	248	77
AIR/FUEL RATIO	14.66	14.72	14.67	14.72	14.86	14.73
EMISSION RATES, G/HR						
CO	658.0	324.2	535.5	216.3	283.7	187.3
HC	38.9	2.6	22.5	.8	12.7	.8
NOX+	115.8	43.4	49.6	10.9	25.5	7.9
OIL TEMPERATURE, F	267	267	265	265	263	263
OIL PRESSURE, PSI	33	33	33	33	33	33
COOLANT TEMPERATURE, F	182	182	180	180	182	182
EXHAUST PRESSURE, IN. H2O	33.0	21.0	25.0	16.0	21.0	14.0
EXHAUST TEMPERATURE, F	1198	906	1172	880	1153	871

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	110.1	110.2	111.1	111.2	112.1	112.2
TEST DATE	1/13/77	1/13/77	1/13/77	1/13/77	1/14/77	1/14/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	744.2	744.2	744.2	744.2	744.2	744.2
HUMIDITY, GRAINS/LB	44	44	44	44	44	44
TEMPERATURE, F	79	79	78	78	82	82
ENGINE SPEED, RPM	750	750	650	650	4600	4600
TORQUE, FT-LB	7.2	7.3	19.2	19.2	60.0	60.0
POWER, BHP*	1.0	1.0	2.4	2.4	52.4	52.4
FUEL RATE, LB/HR	2.5	2.5	2.4	2.4	31.0	31.0
IGNITION TIMING, DEG BTDC	12.0	12.0	10.0	10.0	30.0	30.0
MANIFOLD VACUUM, IN HG	18.0	18.0	15.5	15.5	4.0	4.0
THROTTLE ANGLE, DEG	.0	.0	.0	.0	54.0	54.0
INTAKE MAN. TEMP., F	127	127	132	132	131	131
CONCENTRATIONS, DRY BASIS						
CO, %	.1297	.0050	.0960	.0069	.2090	.0039
CO2, %	13.45	13.74	13.68	13.87	14.27	14.47
O2, %	2.27	2.09	2.08	1.92	1.26	1.17
HC, PPMC	1584	91	2357	203	52	19
NOX, PPM	82	77	173	141	1802	1802
AIR/FUEL RATIO	16.20	16.29	15.98	16.15	15.63	15.66
EMISSION RATES, G/HR						
CO	21.1	.8	15.1	1.1	412.3	7.8
HC	13.0	.7	18.6	1.6	5.1	1.9
NOX+	1.9	1.8	3.9	3.2	511.7	512.5
OIL TEMPERATURE, F	172	172	175	175	263	263
OIL PRESSURE, PSI	27	27	24	24	35	35
COOLANT TEMPERATURE, F	160	160	179	179	182	182
EXHAUST PRESSURE, IN. H2O	5.0	3.0	3.0	2.0	150.0	99.0
EXHAUST TEMPERATURE, F	549	501	487	473	1450	1151

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	113.1	113.2	114.1	114.2	115.1	115.2
TEST DATE	1/13/77	1/13/77	1/13/77	1/13/77	1/13/77	1/13/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	744.2	744.2	744.2	744.2	744.2	744.2
HUMIDITY, GRAINS/LB	44	44	44	44	44	44
TEMPERATURE, F	79	78	79	79	79	79
ENGINE SPEED, RPM	1000	1000	1000	1000	1000	1000
TORQUE, FT-LB	.2	.2	10.5	10.5	.2	.0
POWER, BHP*	.0	.0	2.0	2.0	.0	.0
FUEL RATE, LB/HR	2.8	2.8	2.8	2.8	2.8	2.7
IGNITION TIMING, DEG BTDC	11.0	11.0	13.0	13.0	11.0	11.0
MANIFOLD VACUUM, IN HG	19.5	19.5	18.0	18.0	20.0	20.0
THROTTLE ANGLE, DEG	.0	.0	3.0	3.0	.0	.0
INTAKE MAN. TEMP., F	126	126	127	127	128	128
CONCENTRATIONS, DRY BASIS						
CO, %	.1667	.0048	.1049	.0063	.2615	.0046
CO2, %	12.72	13.10	11.64	11.68	13.65	12.81
O2, %	3.68	3.22	5.12	5.16	2.32	3.70
HC, PPMC	512	71	949	59	746	35
NOX, PPM	71	62	72	74	78	54
AIR/FUEL RATIO	17.46	17.21	18.88	19.14	16.24	17.64
EMISSION RATES, G/HR						
CO	33.5	.9	22.9	1.4	48.6	.9
HC	5.2	.7	10.4	.7	7.0	.4
NOX+	2.1	1.8	2.3	2.4	2.1	1.5
OIL TEMPERATURE, F	180	180	182	182	182	182
OIL PRESSURE, PSI	28	28	28	28	28	28
COOLANT TEMPERATURE, F	173	173	177	177	177	177
EXHAUST PRESSURE, IN. H2O	5.0	3.0	5.0	3.0	5.0	3.0
EXHAUST TEMPERATURE, F	570	520	563	546	555	529

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	116.1	116.2	118.1	118.2	119.1	119.2
TEST DATE	1/13/77	1/13/77	1/13/77	1/13/77	1/13/77	1/13/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	744.2	744.2	744.2	744.2	744.2	744.2
HUMIDITY, GRAINS/LB	44	44	44	44	44	44
TEMPERATURE, F	80	80	80	80	79	79
ENGINE SPEED, RPM	1500	1500	1500	1500	1500	1500
TORQUE, FT-LB	10.0	10.0	40.0	40.0	25.0	25.0
POWER, BHP*	2.8	2.8	11.4	11.4	7.1	7.1
FUEL RATE, LB/HR	4.6	4.6	7.3	6.9	5.3	5.6
IGNITION TIMING, DEG BTDC	33.0	33.0	33.0	33.0	33.0	33.0
MANIFOLD VACUUM, IN HG	19.0	19.0	11.0	11.0	14.0	14.0
THROTTLE ANGLE, DEG	5.0	5.0	12.0	12.0	9.0	9.0
INTAKE MAN. TEMP., F	128	128	170	170	168	168
CONCENTRATIONS, DRY BASIS						
CO, %	.7208	.5553	.1589	.0052	.1530	.0067
CO2, %	14.27	14.37	14.42	14.63	14.04	14.75
O2, %	1.07	1.12	1.49	1.40	1.87	1.32
HC, PPMC	2040	2436	2052	98	2560	101
NOX, PPM	106	108	248	263	136	135
AIR/FUEL RATIO	14.99	15.06	15.53	15.75	15.75	15.68
EMISSION RATES, G/HR						
CO	200.0	156.7	73.2	2.3	51.9	2.4
HC	28.4	34.5	47.5	2.2	43.6	1.8
NOX+	4.2	4.4	16.5	16.7	6.7	7.0
OIL TEMPERATURE, F	168	168	195	195	190	190
OIL PRESSURE, PSI	32	32	30	30	30	30
COOLANT TEMPERATURE, F	179	179	179	179	179	179
EXHAUST PRESSURE, IN. H2O	6.0	5.0	11.0	9.0	9.0	8.0
EXHAUST TEMPERATURE, F	580	492	814	751	784	739

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	121.1	121.2	123.1	123.2	124.1	124.2
TEST DATE	1/13/77	1/13/77	1/13/77	1/13/77	1/13/77	1/13/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	744.2	744.2	744.2	744.2	744.2	744.2
HUMIDITY, GRAINS/LB	44	44	44	44	44	44
TEMPERATURE, F	82	82	81	81	82	82
ENGINE SPEED, RPM	2000	2000	2800	2800	2800	2800
TORQUE, FT-LB	82.0	82.0	.0	.0	10.0	10.0
POWER, BHP*	31.1	31.1	.0	.0	5.3	5.3
FUEL RATE, LB/HR	15.3	15.7	7.0	7.1	8.1	8.0
IGNITION TIMING, DEG BTDC	17.0	17.0	43.0	43.0	42.0	42.0
MANIFOLD VACUUM, IN HG	5.0	5.0	18.0	18.0	17.0	17.0
THROTTLE ANGLE, DEG	34.0	34.0	12.0	12.0	15.0	15.0
INTAKE MAN. TEMP., F	128	128	222	222	215	215
CONCENTRATIONS, DRY BASIS						
CO, %	.0757	.0028	.3385	.0147	.3335	.0140
CO2, %	14.45	14.72	14.63	15.21	14.96	15.45
O2, %	1.36	1.14	1.06	.59	.69	.26
HC, PPMC	46	24	2105	33	1078	28
NOX, PPM	1876	1878	75	64	129	101
AIR/FUEL RATIO	15.75	15.63	15.15	15.19	15.01	14.97
EMISSION RATES, G/HR						
CO	74.2	2.8	146.7	6.4	164.7	6.8
HC	2.3	1.2	45.8	.7	26.7	.7
NOX+	264.6	269.4	4.7	4.0	9.2	7.0
OIL TEMPERATURE, F	210	210	225	225	224	224
OIL PRESSURE, PSI	32	32	32	32	35	35
COOLANT TEMPERATURE, F	183	183	179	179	179	179
EXHAUST PRESSURE, IN. H2O	35.0	25.0	11.0	8.0	12.0	10.0
EXHAUST TEMPERATURE, F	1167	944	1000	838	1023	825

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	126.1	127.1	128.1	156.1	157.1	158.1
TEST DATE	1/18/77	1/18/77	1/18/77	1/21/77	1/21/77	1/21/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	745.5	745.5	745.5	753.3	753.3	753.3
HUMIDITY, GRAINS/LB	32	32	32	35	35	34
TEMPERATURE, F	77	77	77	81	82	81
ENGINE SPEED, RPM	1000	1500	2000	4600	4400	3800
TORQUE, FT-LB	-14.0	-23.5	-24.8	97.5	100.0	109.0
POWER, BHP*	2.6	6.6	9.3	83.9	82.4	77.5
FUEL RATE, LB/HR	2.0	1.9	1.5	45.0	44.2	39.9
IGNITION TIMING, DEG BTDC	9.5	10.0	12.0	29.0	30.0	28.0
MANIFOLD VACUUM, IN HG	22.5	24.0	24.5	2.0	2.0	2.0
THROTTLE ANGLE, DEG	.0	.0	.0	63.0	63.0	63.0
INTAKE MAN. TEMP., F	132	137	140	104	106	96
CONCENTRATIONS, DRY BASIS						
CO, %	.0000	.0000	.0000	4.1984	4.1395	3.8841
CO2, %	2.42	1.89	.98	12.31	12.29	12.31
O2, %	17.00	18.00	19.00	.16	.18	.18
HC, PPMC	13	13	49	2619	2624	2440
NOX, PPM	4	3	4	1432	1438	1485
AIR/FUEL RATIO	83.68	108.16	203.98	12.99	13.02	13.12
EMISSION RATES, G/HR						
CO	.0	.0	.0	10064.9	9767.5	8341.3
HC	.5	.6	3.2	315.3	311.0	263.2
NOX+	.4	.4	.7	476.3	470.4	439.5
OIL TEMPERATURE, F	182	182	183	289	292	284
OIL PRESSURE, PSI	30	32	33	32	32	31
COOLANT TEMPERATURE, F	175	172	171	184	183	183
EXHAUST PRESSURE, IN. H2O	3.0	4.0	5.0	22.0	22.0	17.0
EXHAUST TEMPERATURE, F	468	522	670	1106	1094	1065

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY

ENGINE CODE VEGA23

TEST NUMBER	159.1	160.1	161.1	162.1	163.1	164.1	165.1
TEST DATE	1/21/77	1/21/77	1/21/77	1/21/77	1/21/77	1/21/77	1/21/77
FUEL CODE	7619	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	753.3	753.3	753.3	753.3	753.3	753.3	753.3
HUMIDITY, GRAINS/LB	34	34	34	35	35	34	34
TEMPERATURE, F	81	80	81	79	80	79	80
ENGINE SPEED, RPM	3200	2800	2600	2000	1500	1000	4400
TORQUE, FT-LB	115.0	116.5	115.5	115.0	102.0	104.0	90.0
POWER, BHP*	68.8	61.0	56.1	42.9	28.6	19.4	74.0
FUEL RATE, LB/HR	36.9	33.5	32.2	24.4	18.5	12.1	39.1
IGNITION TIMING, DEG BTDC	25.0	18.0	17.5	16.0	10.0	10.0	29.0
MANIFOLD VACUUM, IN HG	1.5	.5	.5	.5	.5	.5	1.0
THROTTLE ANGLE, DEG	63.0	63.0	63.0	63.0	63.0	63.0	58.0
INTAKE MAN. TEMP., F	96	108	112	111	115	117	125
CONCENTRATIONS, DRY BASIS							
CO, %	4.8736	5.8000	6.6000	6.3173	7.2600	4.9981	1.1447
CO2, %	11.63	10.80	10.39	10.80	10.02	11.33	13.37
O2, %	.15	.14	.14	.18	.16	.24	.86
HC, PPMC	2655	3078	3335	3736	4332	5748	1029
NOX, PPM	840	432	332	569	235	601	2501
AIR/FUEL RATIO	12.66	12.21	11.89	12.04	11.59	12.39	14.85
EMISSION RATES, G/HR							
CO	9399.7	9844.5	10512.2	7680.2	6508.5	3100.5	2720.1
HC	257.2	262.4	266.8	228.1	195.0	179.1	122.8
NOX+	223.3	101.1	72.9	95.9	29.2	51.3	818.9
OIL TEMPERATURE, F	272	254	250	216	216	226	255
OIL PRESSURE, PSI	31	31	30	33	30	24	35
COOLANT TEMPERATURE, F	182	182	180	181	178	182	183
EXHAUST PRESSURE, IN. H2O	15.0	11.0	10.0	7.0	5.0	4.0	12.0
EXHAUST TEMPERATURE, F	1016	991	963	892	851	773	1111

* CORRECTED SAE J816B
\+ CORRECTED FOR HUMIDITY